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Minimization of collateral damage is an objective of the United States Air Force (USAF) whenever it conducts hostile operations. While the USAF has often expressed concern about causing collateral damage, its actions have not always reflected a consistent level of commitment. This essay explores the evolution of USAF concerns about collateral damage and examines the causes and effects of this unfortunate by-product of airpower. It concludes that the concerns harbored about causing collateral damage reduce the military effectiveness of airpower. This loss of effectiveness is not always important. For example, when a resource rich coalition conducts an air campaign against an inferior adversary, that coalition can discriminate in its application of airpower by allocating great effort to the avoidance of collateral damage. In a different context, such asymmetry may not exist. Commanders then might have to focus on achieving objectives while paying little attention to the possibility of collateral damage. In either case, collateral damage will likely occur, varying only in degree. The USAF can take actions which will help alleviate some of the causes of collateral damage. Improvements in the areas of planning and technology provide certain relief, but ultimately, political and military leaders must accept that collateral damage is an inevitable part of airpower.

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COLLATERAL DAMAGE AND THE UNITED STATES AIR FORCE

BY

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ABOUT THE AUTHOR

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Here's to Major Mark Conversino who, although he did not read this essay quite as many times as I did, had the innate ability to inform me as to what it was I was trying to say. Here's also to my wonderful wife, Nicole V. Brown, who took up all the slack I left lying about while trying to bring this project through to completion. Apologies to my daughters Callahan and Reilly for being gone so often. Tomorrow belongs to you.

Abstract

Minimization of collateral damage is an objective of the United States Air Force (USAF) whenever it conducts hostile operations. While the USAF has often expressed concern about causing collateral damage, its actions have not always reflected a consistent level of commitment. This essay explores the evolution of USAF concerns about collateral damage and examines the causes and effects of this unfortunate by-product of airpower. It concludes that the concerns harbored about causing collateral damage reduce the military effectiveness of airpower. This loss of effectiveness is not always important. For example, when a resource rich coalition conducts an air campaign against an inferior adversary, that coalition can discriminate in its application of airpower by allocating great effort to the avoidance of collateral damage. In a different context, such asymmetry may not exist. Commanders then might have to focus on achieving objectives while paying little attention to the possibility of collateral damage. In either case, collateral damage will likely occur, varying only in degree. The USAF can take actions which will help alleviate some of the causes of collateral damage. Improvements in the areas of planning and technology provide certain relief, but ultimately, political and military leaders must accept that collateral damage is an inevitable part of airpower.

Chapter 1

Introduction

This is war and some civilians are bound to get killed.

—Admiral Ulysses S. Grant Sharp

The United States Air Force (USAF) often proclaims its desire to “minimize collateral damage” when conducting hostile operations.¹ Doctrine and training manuals contain statements indicative of this aspiration.² Senior leaders are apt to reiterate it any time the USAF executes an attack. This apparent commitment to keep collateral damage low raises several fundamental questions. Specifically, why does the USAF seek minimal collateral damage during operations? What are the causes of collateral damage? How does the potential for collateral damage affect USAF operations? What can the USAF do to ensure its ability to minimize collateral damage? If we are successful at minimization, does that set a standard which the USAF must meet in all future operations? A determination of the answers to these questions requires an investigation into the many factors, which influence the occurrence of collateral damage.

The purpose of this paper is to examine these factors and determine the answers to the above questions. The methodology of this thesis includes: a study of how the Law of Armed Conflict influences USAF combat actions, an examination of past instances of airpower-inflicted collateral damage, and an investigation into the effects potential

collateral damage can have on USAF operations. While I cannot chronicle every instance of collateral damage, I will present representative samples, which illustrate its basic causes. Examination of these examples will shed light on how potential and actual collateral damage can affect USAF operations. Analysis of how the USAF approached this minimization problem in Desert Storm can provide an indication of how well airpower can minimize collateral damage while still successfully achieving military objectives. The investigation begins by considering the definition of collateral damage.

Most of the references that exist in Air Force manuals merely state that commanders and planners consider the potential for collateral damage when taking military action and minimize such damage if possible. Few of the citations give more than cursory attention as to what constitutes collateral damage. The Air Force provides only a simple definition: “the damage to surrounding resources, either military or non-military, as a result of actions or strikes directed specifically against enemy forces or military facilities.”³ This is quite narrow and does not deal with casualties to noncombatants, which are probably our major concern. Certainly, the Air Force regrets harm it causes to innocent civilians and implies this in any definition meant to elucidate the inadvertent outcomes of military actions. Air Force Pamphlet 110-34, *Commander’s Handbook on the Law of Armed Conflict*, states that “it is not unlawful to cause incidental injury or death to civilians or damage to civilian property during an attack on a legitimate military objective.”⁴ The pamphlet gives the name “collateral damage” to the incidental results of such attacks.

The definition of collateral damage is also of concern to non-military groups. Influential organizations like Greenpeace and the International Committee of the Red Cross have their own concepts of collateral damage which are more far-ranging than that

of the USAF.⁵ The viewpoints of non-governmental organizations like these may occasionally be important to the USAF because of the political influence they may wield. This influence can restrict the employment of airpower through changes in international law or political pressure on domestic US leaders.⁶ It behooves the airpower strategist to be aware that more than one concept of collateral damage exists.

Actual collateral damage can produce various responses, which affect USAF operations. For example, excessive destruction of an adversary's infrastructure may cause that nation's government to be less cooperative in achieving post-war stability; perhaps a coalition member who believes greater than necessary damage is being inflicted will withdraw basing rights for the other members; or it is possible that domestic support for a war might wane if collateral damage exceeds certain levels.⁷ These types of responses can undermine the USAF's ability to effectively conduct operations. To deal with the possibility of such responses, the USAF often places restrictions on operational attack methods. This can reduce the chance of collateral damage occurring, but it can also reduce airpower's effectiveness and efficiency.

The airpower strategist seeks to mitigate such reductions. One of his primary tasks is to compare the potential military advantage from an operation against the negative implications arising from possible collateral damage. In order to do this effectively, he must attempt to predict both. He must understand the possible political reactions to the operation and to any collateral damage. He must also determine how important these responses are to the USAF. Only then can he make a logical decision about the best way to use airpower to help in efficiently attaining the political objectives of the operation. A greater understanding of all aspects of collateral damage can "guide our efforts, gauge our

successes, and illuminate our problems” during the next air campaign.⁸ For that reason, it is logical for the strategist to possess a thorough awareness of the effects of potential and actual collateral damage.

To help gain that awareness, Chapter Two will examine how both international law and morality have influenced the way in which nations used aerial attack against their enemies. Civilians were usually a protected group but were not always immune from the effects of attack from the air. When the law was not sufficient to protect them, leaders hoped a moral code would fill the void. This morality provided the guidance for minimizing collateral damage used in most American airpower campaigns.

Chapter Three investigates the causes of collateral damage from air attack in American conflicts. It presents eight factors which can cause collateral damage and illustrates them with examples. Chapter Four examines the effects of potential and actual collateral damage on USAF operations.

A case study of Operation Desert Storm determines contemporary USAF actions before and after incidents of collateral damage. Chapter Five opens that study by examining how the US-led Coalition planned to minimize airpower-inflicted collateral damage. It investigates the unclassified aspects of the air campaign to determine if the Coalition, as General Norman Schwarzkopf said at a briefing on the first day of the war, did “absolutely everything we possibly [could] in this campaign to avoid injuring, or hurting, or destroying innocent people.”⁹ Chapter Six concludes the essay by addressing several considerations about how the USAF might limit the occurrence of airpower-inflicted collateral damage.

The USAF claims a core competency of precision engagement because of the ability to “find, fix, or track and target anything that moves on the surface of the Earth.”¹⁰ This ability, whether real today or planned for the future, implies that we have the responsibility to do our best to understand the causes and consequences of all the results of any engagement, including any resultant collateral damage. A thorough inquiry into the nature of collateral will serve the USAF well when national authorities choose airpower to achieve America’s goals.

¹¹. Air Force Pamphlet (AFP) 110-34, *Commander’s Handbook on the Law of Armed Conflict*, 25 July 1980, 5-3.

². Air Force Manual (AFM) 1-1 vol. 1, *Basic Aerospace Doctrine of the United States Air Force*, March 1992, 3-5. AFP 110-34, 53. Air Force Pamphlet (AFP) 110-31, *International Law-The Conduct of Armed Conflict and Air Operations*, 19 November 1996, 5-10.

³. Air Force Manual (AFM) 11-1, *Air Force Glossary of Standardized Terms*, 29 September 1989. The purpose of this book is “To enhance communication through common understanding of terms that have acquired some special meaning or application in military operations.”

⁴. AFP 110-34, 3-3.

⁵. A Greenpeace study on the environmental impact of Operation Desert Storm claims that attacks on military targets can have a great effect on the civilian population. The attacks causing “efficient destruction of civil installations such as electrical engineering, oil supply, roads and bridges, and of industrial research and production, all

hav[e] a profound effect on the population's ability to sustain modern life. The targeting of these life support functions of the civil population, even for the military effect, disabled the very objects that are otherwise restricted from attack: medical care, safe water supplies, and food. In modern society, the support systems of these objects are inseparable from those that also feed the military establishment.” William M. Arkin, Damian Durrant, and Marianne Cherni, *On Impact, Modern Warfare and the Environment, A Case Study of The Gulf War* (London, Greenpeace, 1991), 147-148. The International Committee of the Red Cross, in commentary defining collateral damage, suggests it includes any military action which would have effects on the civilian population which could not be repaired in less than three months. Hays W. Parks, “Air War and the Law of War,” *Air Force Law Review* (1990), 87-88.

⁶. The International Committee of the Red Cross (ICRC) has published statements equating aerial bombardment with torture and summary execution. The organization has a “fixation against the employment of airpower,” and desires to closely regulate “(if not prohibit) the use of airpower beyond the immediate battlefield.” See Parks, 103. Despite this, the US delegation to the Geneva Convention in 1977 signed Protocol I which advanced many of the restrictions the ICRC favored and which attempted, in effect, to curtail aspects of bombing used by the US. The US Joint Chiefs of Staff review led to a decision to not submit Protocol I to the US Senate for treaty ratification. For a thorough discussion of the ICRC and its attempts at regulation see Parks, 103-105, 218-220.

⁷. During the air war in Vietnam, Sweden brought international public opinion to bear against US bombing. The Swedish government believed that claims of

indiscriminate bombing would initiate an outcry of world public opinion that would pressure the US to reduce its efforts. Even though the bombing was not in violation of the law of war, this increased attention forced the US to refrain from certain tactical options and limit its bombing. See Parks, 81. The Linebacker II campaign against North Vietnam, while causing relatively little collateral damage, precipitated a substantially negative domestic response. See Mark Clodfelter, *The Limits of Airpower, The American Bombing of North Vietnam* (New York, The Free Press, 1989), 191, 195. US senior officials saw the bombing of the Al-Firdos bunker during Desert Storm, and the large number of civilian casualties, as a detriment to coalition solidarity. See Rick Atkinson, *Crusade: The Untold Story of the Persian Gulf War* (Boston, Houghton Mifflin Company, 1993), 289.

⁸. This is how the introduction to AFM 1-1, vol. 1, describes the need for a common doctrine.

⁹. *Needless Deaths in the Gulf War: Civilian Casualties During the Air Campaign and Violations of the Laws of War* (Human Rights Watch, 1991), 77.

¹⁰. General Ronald R. Fogleman, “The Core Competencies of the Air Force,” *Air Force Magazine*, January 1997, 24.

Chapter 2

Collateral Damage and The Law of War

International law can always be argued pro and con, but of this matter of the use of aircraft in war there is, it so happens, no international law at all.

*Sir Arthur Harris
Marshal of the Royal Air Force*

The assertion by the wartime leader of the Royal Air Force's Bomber Command acknowledges the limitations of law during war. Harris' statement was recognition of the pre-war failure of nations to agree on restrictions to aerial attack and so control its great potential for destruction, including collateral damage.¹¹ This chapter will examine the evolution of international laws dealing with collateral damage caused by bombing.¹² It will also investigate the guidelines used when the law did not sufficiently address certain situations. This will provide background information about some of the rationale the USAF uses when it tries to minimize collateral damage.

The Need for a Law of War

The law of war (often termed the law of armed conflict) is the body of international law which regulates the conduct of states and combatants engaged in armed hostilities.¹³ The necessity for a law of war comes from the simple tug-of-war between two contradictory forces: the need for an ethical standard of civilization and the requirements

of war itself. The evolution of the laws and customs of war from antiquity to the present was part of the gradual emergence of a standard of civilization within the Western world. This standard emerged as the assertion of certain religious, moral, and humanitarian values relating to the protection of the individual's life, health, and property.¹⁴ This standard reflected changing influences exerted by the great religious philosophies on the concept of "man" and, consequently, of his behavior toward his enemy, combatant or noncombatant.¹⁵ These so called "laws of humanity" prohibit causing unnecessary human suffering as well as indiscriminate destruction.¹⁶ War, on the other hand, is "characterized by organized, purposeful violence," usually intended to destroy the opposing forces.¹⁷ The law of war attempts to mitigate this conflict.

The law of war tries to "make sure that the violence of war is used to defeat the enemy's forces, and not merely to cause purposeless, unnecessary destruction."¹⁸ Adherence to the law of war by combatants will help prevent war from adversely impacting persons and things possessing little, if any, military value. The law tries to stop the degeneration of war into savagery. It helps protect combatants and noncombatants from unnecessary suffering. When needless damage and harm do not occur, "the bitterness and hatred arising from war is lessened, and thus it is easier to restore peace."¹⁹ The inspiration for the law of war comes from the humanitarian desire of civilized nations to lessen the effects of conflicts.

The law of war is not entirely codified. Treaties and international agreements address certain aspects of the conduct of war while the customary practices of nations deal with other aspects. Aerial conflict is one of the least codified areas of the law of war. Hays W. Parks speculates that this is "because most international lawyers have little

knowledge of military operations, doctrine, and technology.” Additionally, he states that “Nations are reticent to regulate a new means of war with rules that might have the potential of hampering its effective employment, or limit its use against an opponent who has no concern for the law of war.” Several problems stem from the difficulty in reaching agreement on language that would be “equally applicable to all nations, under all circumstances, and that would not provide a tactical or strategic advantage to one nation over another.”²⁰

The United States is a party to several law of war treaties intended to limit unnecessary suffering by combatants and noncombatants alike during war.²¹ The Hague Conventions of 1907 and the four Geneva Conventions of 1949 contain the major codified aspects subscribed to by the US. Current Defense Department policy states that “the Armed Forces of the United States shall comply with the law of war in the conduct of military operations and related activities in armed conflict, however such conflicts are characterized.”²²

The law of war is primarily a Western concept. Even though over 95% of the world’s nations are party to the four 1949 Geneva Conventions, this treaty has limited acceptance in practice outside the Western world. There has been little implementation of those treaties in most third world countries.²³

Beginnings of the Law of War

The law of war evolved from the progress of Western civilization. Its foundations are customs such as the Just War Tradition.²⁴ The Just War Tradition is a body of Western literature, which has developed over several centuries to place moral constraints

on warfare. At its most basic level it includes criteria for deciding whether entry into war is just and for determining the justice of conduct during war.²⁵ Clergy, legal theorists, and philosophers from Western Europe developed the Just War Tradition. It originated as an expansion of Greco-Roman teaching emphasizing the preservation of public order and civic peace.²⁶ By way of the Old and New Testaments as well as Roman law and custom, the concept of laws governing warfare took root in Christian thought.²⁷ It was first treated in a systematic manner and a Christian context by St. Augustine, who argued in 430 AD that self defense to preserve peace justified warfare.²⁸ Similarly, St. Thomas Aquinas defended killing in self defense as proper because it was for the public good.²⁹ During the Reformation various Protestant and Catholic writers dealt with just war issues.

Just War Tradition is not purely a Judeo/Christian phenomenon. Parallel concepts exist in other cultures though they take different forms. Most civilizations “have had a body of doctrine reconciling the religious, ethical, and economic values of the civilization and the political and legal values of the particular state with the practices of war.”³⁰ Islamic thought has traditionally sanctioned fighting “in the cause of god” and in defense of the weak and oppressed.³¹ Buddhism, while rejecting all killing, does recognize that defense of the nation is appropriate.³² While the Just War Tradition evolved as a Western ideal, it was not unique in establishing moral justification for conducting war.

A Law of War for Bombing

In 1874, fifteen European nations sent delegates to Brussels to construct a law of war. Though the nations represented never ratified the resulting Brussels Declaration, it constituted the basis of the Hague Convention of 1907. By that time, airplanes had

become a reality. Still, support did not exist to construct laws dealing with war in the air because nations were often reticent to regulate a new capability of war. New rules might impinge upon the employment of the aircraft as a tool of war or limit its use against an adversary who has no concern for the law of war.³³ Phillip S. Meilinger believes that the main reason attempts at legislation failed was the newness of the air weapon; few people understood its capabilities, so it was difficult to construct laws regulating its use.³⁴ Nevertheless, this convention did set out some important guidelines useful for determining the objectives of bombing. The agreements reached recognized that “the right of the belligerent to adopt means of injuring the enemy is not unlimited,” prohibited bombardment of undefended towns, and required military occupation authorities to respect “the lives of persons and personal property.” Additionally, the resultant treaty absolved attackers of responsibility for “unavoidable” collateral damage. These were not new ideas. However, they were a codification of the customs already practiced by most western nations.³⁵ The treaty recognized that collateral damage was the cost of war a nation must bear.³⁶ The US adopted the Convention’s articles in 1910. Still, none of these provisions dealt directly with bombing from the air. Consequently, as Meilinger states, “there were no international laws governing [bombing] in effect at the outbreak of the First World War.”³⁷

The inaccuracy of bombing during World War One brought increased attention to the predicament of civilians in war.³⁸ The 1923 Draft Hague Rules of Air Warfare tried to deal with the problems civilians faced from this new threat: “Aerial bombardment for the purpose of terrorizing the civilian population, of destroying or damaging private property not of military character, or of injuring noncombatants is prohibited.” Specifically, it is

“legitimate only when directed at a military objective, that is to say, an objective of which the destruction or injury would constitute a distinct military advantage to the belligerent.”

In cases where the military objective “cannot be bombarded without the indiscriminate bombardment of the civilian population, the aircraft must abstain from bombardment [unless] in the immediate neighborhood of the operations of land forces.” In that case, it may be legitimate if there exists a “reasonable presumption that the military concentration is sufficiently important to justify such bombardment, having regard to the danger thus caused to the civilian population.”³⁹

These proposed rules legitimized bombing attacks on targets affording military advantage to the enemy while prohibiting intentional attacks, which would harm civilians and private property. Unless enemy land forces were operating nearby, aircraft were prohibited from attacking many of the items essential to the enemy military. The means of military production, transportation, garrisoned troops and other military supporting elements were off limits if situated in cities where attacks would inflict harm on the civilian population.⁴⁰ This restriction differed from the actual practice of nations. The existing law of war allowed attacks on the aforementioned targets, wherever located, as long as attackers used ordinary care to avoid civilian casualties. State practice considered civilian casualties “an inevitable consequence of bombing and a legitimate way to destroy an enemy’s will to resist.”⁴¹ The historic immunity offered noncombatants was based on the range of artillery. The advent of bomber aircraft extended this range and increased the ability to attack military targets far from the battlefield. The 1923 Draft Hague Rules of Air Warfare tried to stem this advance and created a set of rules contrary to accepted

routine, current technology, and military thinking.⁴² As a result, no nation ratified the Rules of Air Warfare.⁴³

Some organizations made additional attempts to draw up guidelines regulating air warfare. The Geneva Convention of 1929 addressed the need for additional protection of civilians. In 1938, the League of Nations passed a non-binding resolution prohibiting the intentional bombing of civilians and any airborne attack, which imperiled civilians.⁴⁴ Several different groups put forward other resolutions, but no signed treaties ever dealt specifically with the issue of bombing. This state of affairs was put into perspective in 1938 when jurist J.M. Spaight wrote:

The law of bombardment is very far from being clear . . . It is indeed in a state of baffling chaos and confusion which makes it almost impossible to say what in any situation the rule really is . . . From one point of view, one might say, indeed, that there is no law at all, for air bombardment.⁴⁵

Despite the international failure to codify a law, by the 1930s a consensus emerged among the major powers regarding the morality of bombing. There were two ideas involved: first, all military objectives were valid targets, but attacks required caution to avoid causing collateral damage; second, the civilian population was not a legitimate target of direct attack but incidental injury to them was the price of waging war. However, the temper of the times in Europe differed from this consensus. The expectation was that any future war would involve massive aerial attacks using chemical weapons on cities and the civilian population.⁴⁶ Some governments prepared for this by developing plans for air raids, evacuations, and massive casualties. Industry manufactured millions of gas masks and filters for civilian use. Neither governments nor

civilians believed the law of war would prevent bombing attacks on the civilian population.⁴⁷

There were additional attempts to codify an international law for airpower. The Geneva Conventions meeting from 1974 until 1977, passed the first international agreement concerned exclusively with the protection of civilians from bombing. However, the resultant treaty was never submitted to the US Senate for ratification. The treaty degraded the importance of the air weapon by prohibiting an attacker from bombing military targets commingled with civilian objects. Additionally, it prohibited strikes against an adversary using his civilian populace to shield his military forces, for fear of injuring the civilians. This type of law would encourage unscrupulous behavior because of the temptation to protect vital industries and forces by placing civilians around them. Since these conventions, the International Committee of the Red Cross and other groups have worked to reaffirm the immunity of civilians from bombing and clarify how the law of war protects them.⁴⁸

The Law of War Today

In the Western world, when the codified law of war does not address certain situations, common practice and the Just War Tradition become the sources used to guide actions.⁴⁹ These sources have usually stressed the immunity of noncombatants while recognizing that incidental harm to them is often difficult to avoid. The law of war, codified in the Geneva Convention for the Protection of Prisoners of War (GPW) (1949), defines a combatant as a person taking part in hostile actions during a violent conflict while acting for a party to the conflict. The GPW classifies a disparate group of people as

noncombatants. This group includes members of the military whose status (chaplain, medical personnel, etc.) precludes them from engaging directly in hostilities. Additional noncombatants are combat personnel unable to participate in hostilities due to sickness, wounds, or confinement as prisoners of war. Generally, noncombatants are all persons other than those considered combatants by the GPW. The legal difference between the two groups is the combatants' status as legal objects of attack. Noncombatants are not objects of attack but neither are they immune from the results of attacks on legal objects in their vicinity.⁵⁰

The law of war stipulates that attacks may only occur on objects with military importance. It lists the categories of targets open to attack under most, but not all circumstances. Included in the *military target* category are tanks, armored vehicles, artillery, military aircraft, naval vessels, weapons, ammunition, and other items normally used in military operations. Structures that provide logistic or administrative support are also legitimate targets. If attackers can avoid excessive collateral damage, civilian aircraft, vehicles, vessels, and buildings are subject to attack if they contain combatant personnel. Also legal targets are those *economic systems which support military action*. This category includes transportation systems, lines of communications, and industrial installations producing military materials. Any economic target is liable to attack if it effectively contributes to military action and its destruction would offer a military advantage. However, attackers are enjoined to take extreme care when attacking dams, dikes, and nuclear power stations. Severe collateral damage might result from flooding or the release of radioactivity. Additionally, methods of warfare used to starve the civilian populace are not allowed. However, if items like food stores, livestock, crops, or

drinking water are used to provide for an enemy's armed forces, they are generally legal to attack. The third category open to attack is *area targets* which by their nature contribute to enemy military effectiveness. Attackers must exercise extreme caution before bombing cities, towns, refugee camps, or any area with a large civilian population. Attackers may strike target set components within these areas if they can locate, identify and individually attack each one. If conditions such as enemy air defense or available ordnance preclude attacking specific targets, then area attack tends to become indiscriminate and of questionable legality. The fourth legitimate target set is *political targets that support military action*. Any agency aiding military operations with command, logistics, or administrative support is open to attack. The last category of targets is *personnel*. Military personnel are always subject to attack even if performing noncombatant duties to support the armed forces. Also open to attack are non-military personnel taking a direct part in hostilities. Protected personnel may lose their exempt status if they take hostile actions against their enemy.⁵¹

The law of war establishes two principles to deal with the immunity of noncombatants and civilian property: discrimination and proportionality. Attackers must make reasonable efforts to discriminate combatants from noncombatants and legitimate military targets from civilian objects.⁵² If this is not possible, the attacker must consider proportionality: "the harm done to civilians and civilian objects in a legitimate attack must be commensurate with the significance of the military objectives sought."⁵³ Proportionality prohibits military attacks, which produce negative effects (such as collateral damage) clearly outweighing the anticipated military gain. It is not unlawful to cause damage to civilian property or to cause injury or death to civilians during the course

of attacks on legitimate military objectives. These attacks must seek to gain military advantage in excess of any anticipated collateral damage. Additionally, attackers must take all possible precautions to minimize civilian casualties and damage. The determination of whether the expected civilian casualties are worth the military gain is a judgment decision made by the attacking commander. He must make this decision based on the facts known at the time even if the enemy has deliberately used civilians to shield military objectives. The commander must also use a similar reasoning process to decide whether a particular attack would cause excessive damage and whether an alternate attack might lessen collateral damage.⁵⁴ The term “military target” must be interpreted by the commander. While a soldier at the front is clearly a military target, is the civilian worker in the munition factory? The commander must also determine what constitutes “undue risk” to civilian life and property. A strict interpretation of these questions means a prohibition on striking many targets. After all, in modern warfare between major powers there is “practically nothing worth attacking which does not have some bearing on the national war effort.”⁵⁵

The principle of “military necessity” justifies the commander’s use of force to achieve a desired objective. The USAF defines military necessity as “measures of regulated force not forbidden by international law which are indispensable for securing the prompt submission of the enemy with the least possible expenditures of economic and human resources.”⁵⁶ This idea is composed of four basic concepts: “that the force used is capable of being, and is, regulated by the user; that the use of force is necessary to achieve as quickly as possible, the partial or complete submission of the enemy; that the force used is no greater than that needed to achieve his prompt submission (economy of

force); and that the force used is not otherwise prohibited.”⁵⁷ Military necessity, however, is not sufficient justification to ignore the prohibitions of international law and custom.⁵⁸

Summary

In examining the evolution of international law dealing with collateral damage caused by bombing, one notes that there is little in the law of war that directly mentions airpower and the unintended harm it can bring to non-combatants and their property. In the absence of codified law, it falls to traditions, common practice, and commander’s judgment to determine when military necessity outweighs concern for humanity. The Just War traditions of discrimination and proportionality provide some protection for the civilian populations in areas subject to hostilities. Unfortunately, the interpretations of these concepts are quite subjective.

¹¹. Hays W. Parks, “Air War and the Law of War” *Air Force Law Review* (1990), 2.

¹². For definitions and development of International Law, see Air Force Pamphlet (AFP) 110-31, *International Law—The Conduct of Armed Conflict and Air Operations*, 19 November 1996,

1-2, 1-3.

¹³. AFP 110-31, 1-2. See also Joint Pub 1-02.

¹⁴. Richard I. Miller, ed., *The Law of War* (Lexington, MA: DC Heath and Company, 1975), 9-13.

¹⁵. On the history of the laws of war, see J.F.C. Fuller, *The Conduct of War, 1789-1861* (New Brunswick, NJ: Rutgers University Press, 1961).

¹⁶. AFP 110-31, 1-3.

¹⁷. Air Force Manual (AFM) 1-1, *Basic Aerospace Doctrine of the United States Air Force*, vol. II, March 1992, 1.

¹⁸. Air Force Pamphlet (AFP) 110-34, *Commander's Handbook on the Law of Armed Conflict*, 25 July 1980, 1-1.

¹⁹. Ibid.

²⁰. Parks, 19, 20, 30.

²¹. According to *Conduct of the Persian Gulf War, (U) Final Report to Congress*, Appendix O (Secret) April 1992, O-1,O-2, the major treaties are:

- Hague Convention IV and its Annex Respecting the Laws and Customs of War on Land of 18 October 1907 (Hague IV)

- Hague Convention V Respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land of 18 October 1907 (Hague V)

- Hague Convention IX Concerning Bombardment by Naval Forces in Time of War of 18 October 1907 (Hague IX)

- The four Geneva Conventions for the Protection of War Victims of 12 August 1949:
 - Geneva Convention for the Amelioration of the Condition of Wounded and Sick in Armed Forces in the Field.

- Geneva Convention for the Amelioration of the Wounded, Sick and Shipwrecked Members of the Armed Forces at Sea.

- Geneva Convention Relative to the Treatment of Prisoners of War.

- Geneva Convention Relative to the Protection of Civilian Persons in Time of War.

The US is not party to the Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict of 14 May 1954. However, this treaty can be binding on the US in certain situations. For example, during Desert Storm, Iraq and other Coalition members were parties to the treaty, so, as is customary in international law, all Coalition members were obliged to abide by it.

Extracted information is unclassified.

²². Department of Defense (DOD) policy on the Law of Armed Conflict is contained in DOD Directive 5100.77, 5 November 1974, establishing the Law of War Program. AFP 110-34, 1-3.

13. Parks, 52, 64.

²⁴. AFP 110-31, 1-2, 1-3.

²⁵. The Just War Tradition continues to evolve. There exist certain criteria to enter a war: the right intention, just cause for a war, that a competent or “duly constituted” authority declare and wage war, that war be a last resort, that war has a reasonable hope of success, that war be a proportionate means to the ends sought, that combatants recognize the “comparative” or “relative” character of their claims to justice. See the American Catholic Bishop’s pastoral letter, *The Challenge of Peace: God’s Promise and Our Response* (Washington, DC: United States Catholic Conference, 1983), 85-100.

²⁶. Roland Bainton, *Christian Attitudes Toward War and Peace* (New York: Abingdon, 1960), 33-43.

²⁷. See book of Deuteronomy 20:1-21.

²⁸. Frederick H. Russell, *The Just War in the Middle Ages* (Cambridge: Cambridge University Press, 1975), 16-39.

²⁹. Joan D. Tooke, *The Just War in Aquinas and Grotius* (London: Society for Promoting Christian Knowledge, 1965), 170-180.

³⁰. Quincy Wright, *A Study of War*, 2nd. ed. (Chicago and London: University of Chicago Press, 1965), 155.

³¹. A. Yusuf Ali, *The Holy Qur'an*. Text, Translation, and Commentary (Brentwood, MD: Amana Corporation, 1983).

³². Melford Spiro, *Buddhism and Society* (New York: Harper and Row, 1970), 46, 430.

³³. Parks, 20.

³⁴. Phillip S. Meilinger, "Winged Defense: Airwar, The Law, and Morality," *Armed Forces and Society*, Fall 1993, vol. 20, number 1, 106.

³⁵. Parks, 14-18. AFP 110-31, 5-3, 5-4.

³⁶. Parks, 18.

³⁷. Meilinger, 105.

³⁸. AFP 110-31, 5-3.

³⁹. Ibid., 5-3, 5-4.

⁴⁰. Ibid., 5-3.

⁴¹. Parks, 31.

⁴². Ibid.

⁴³. AFP 110-31, 5-3.

⁴⁴. Howard S. Leroy, "Limitations of Air Warfare," *Air Law Review*, (Jan. 1941), 27.

⁴⁵. Meilinger, 105-106.

⁴⁶. In the 1920s and 1930s a whole genre of future air war books were written in the US and Europe. Usually, bombing was depicted as inflicting enormous casualties, devastation, etc. Paris, The Future of War, by Basil Liddell Hart, published in London in 1926, features attacks on capitol cities with bombs and gas as the future of air war. Luftkrieg 1936: Die Zertrümmerung von Paris (trans. Air War 1936: Paris Destroyed) by Major Hölders (pseudonym for Robert Knauss) was published in Berlin in 1932. It concerned a fictional air war between the United Kingdom and France. British heavy bombers destroy Paris in Douhet-style raids and cause the French population to panic. The war ends in two weeks. Axel Alexander's Die Schlacht über Berlin (trans. The Battle Over Berlin) was published in Berlin in 1933. This book is about a fictional air war between the Soviet Union and the Western Powers fought over German skies. Germany is heavily bombed with gas and high explosives but the public's training in civil defense prevented panic. The great Russian air offensive was defeated by fighter forces. The bombers did not get through.

⁴⁷. Parks, 49-50.

⁴⁸. Ibid., 218-225.

⁴⁹. Meilinger, 104.

⁵⁰. AFP 110-31, 3-1 through 3-6.

⁵¹. Ibid., 5-1 through 5-19.

⁵². Parks, 4.

⁵³. Meilinger, 114.

⁵⁴. AFP 110-31, 3-1 through 3-6.

⁵⁵. C. Webster and N. Frankland, *The Strategic Air Offensive Against Germany 1939-1945* (London: 1961), 14-15, as cited in Parks, 32.

⁵⁶. AFP 110-31, 1-5, 1-6.

⁵⁷. Ibid.

⁵⁸. In 19th Century German doctrine, *Kriegsraison*, military necessity was used to justify any actions, including violations of the laws of war, if the situation called for it.

The post World War Two Nuremberg war trials rejected this view. “Armed conflict must be carried on within the limits of the prohibitions of international law, including the restraints inherent in the principle of necessity.” See AFP 110-31, 1-6.

Chapter 3

Causes of Collateral Damage from Aerial Attack

I don't want any more of this crap about the fact we couldn't hit this target or that one.

Richard M. Nixon

Military commanders who are aware of the causes of collateral damage are better equipped to make decisions about air attack operations requiring minimization of such damage. The knowledge of which actions are likely to produce collateral damage allows these commanders to choose attack methods which avoid undesirable outcomes. To effectively minimize “incidental injury or death to civilians or damage to civilian property during [attacks] on . . . legitimate military objective[s],” an airpower planner must first be aware of why collateral damage happens.⁵⁹ There is a dearth of information addressing such causes. No readily available studies have undertaken an extensive examination of the various reasons why airpower causes collateral damage. The simple reasoning is that weapons launched from aircraft strike too close to noncombatants and civilian objects. The resultant explosions cause civilian casualties and destroy their property. Unfortunately, this explanation fails to address the reasons why the weapons impacted where they did. Determining those reasons—the causes of collateral damage—requires a more extensive examination.

While no comprehensive examination of the subject exists, there are numerous campaign studies, which address causes specific to that campaign's instances of collateral damage. These studies, by design, do not take an overarching viewpoint examining the causes common to such instances throughout airpower's brief history. This chapter, on the other hand, takes on that task in a modest exploration of the causes of collateral damage from air operations. It presents various historical examples and subjectively classifies each one based on the primary cause, which led to the collateral damage. It was necessary to rely on the interpretation of others as to the primary cause inflicting the collateral damage. However, the causes presented are a starting point, which can be valuable to those tasked with projecting airpower while minimizing collateral damage.

Problems in Determining Causes

It is difficult to ascertain many of the facts about an attack after it has occurred. There are various reasons for this: many aspects of the attack are classified, witnesses are dead, the horror of combat impairs accurate recall, recording assets are destroyed, or the confusion of war clouds the reality of what actually happened. When these factors are present, it is doubly difficult to assign accountability for civilian casualties in a complex strike against a target defended by sophisticated enemy air defenses. A page from history will help clarify this point. On the 10th of May 1940, aircraft bombed the German city of Freiburg. British denials of any air operations near the city on that date did not prevent Nazi propaganda from exploiting the deaths of civilians as an example of British barbarism. In 1948, British military historian J.F.C. Fuller wrote a scathing commentary denouncing the Royal Air Force for the attack. Eight years later, German historians

announced that errant Luftwaffe aircraft had bombed Freiburg by mistake on that day. The lesson to be noted is that it is often difficult to determine responsibility for an action during war. This is especially true when an enemy controls the location where the incident occurred and finds propaganda value in exploiting it. Evidently, correct assessments are difficult to achieve if even a reputable military author can make such an error pursuing postwar research.⁶⁰ Perhaps the Germans, more concerned with other matters after the war, could have discovered and revealed the truth earlier than they did. Nevertheless, when an individual or a nation conceals the truth, fuel is added to the fire of war's confusion.

The difficulty in assessing facts and determining the status of injured parties makes formulating a list of the causes of collateral damage difficult. A problem arises when one attempts to determine whether people killed by air attack were truly noncombatants and if damaged property had military value. In Chapter Two I discussed the often subjective assessments made by commanders employing airpower. Subjectivity is also present when categorizing the causes of collateral damage. For example, each of the listed causes can be the primary cause, a contributing cause, or one of multiple causes which resulted in collateral damage. An accurate assessment is usually elusive. Additionally, there are similarities between categories and it is possible to include the cause of a specific incident in more than one category. This again depends on a subjective assessment. Although the list has limitations, compiling it has merit because such a list can provide commanders with a guide to help them plan ways to minimize potential collateral damage. It is not possible to obtain all the relevant facts about instances of collateral damage, but a list

created from causes verified by reliable sources combined with conjecture about probable causes, can provide a useful tool for planning and conducting future attack operations.

Influencing Factors

Contextual factors can increase or decrease the probability of any particular event or circumstance being the cause of collateral damage. These factors include the nature of the war, the type of weapons used, and the targets attacked. The nature of the war determines the restrictions placed on the methods of attack. A total war may have no restrictions on the targets chosen for attack because the war is likely to involve national survival. In such a case, the only way to survive may be to attack the enemy's essential targets without regard to any law or humanitarian concern. Alternatively, a limited conflict may restrict attacks to military targets in certain areas at specific times because any collateral damage might negate the limited gains sought. (This is explained in Chapter Four) The nature of the war can also influence the type of weapons used. A nation fighting for survival may resort to nuclear or chemical weapons, which can easily cause indiscriminate collateral damage. Belligerents using conventional weapons in a less intense war are capable (though by no means certain) of being more discriminate and so causing less collateral damage. The accuracy and planned effect of the weapons used will influence the likelihood of collateral damage. The choice of targets is another influencing factor. Attacking military targets near urban or residential areas, without using precision weapons, increases the likelihood of collateral damage. Attacks well removed from the civil populace are less likely to be a causal factor. Obviously, the

ability of an enemy to retaliate in kind is a major influencing factor in limiting what weapons are employed and what targets are attacked.

Causes of Collateral Damage

There are eight causes of collateral damage from air attack. Each is distinct enough in its own right to warrant separate consideration by any airpower planner or commander attempting to keep collateral damage to a minimum. This essay makes no attempt to determine which cause occurs most often or which is easiest to control. The fog, friction, and chance present in war make such distinctions unique to each conflict.

The following section presents examples of collateral damage from various operations. The most likely cause of each incident is explained. Some examples may have more than one cause. In such cases, a subjective assessment of the primary cause determines the proper category. A strict interpretation could include every example in the first category because collateral damage is possible anytime an aircraft is aloft with armed weapons. This is because in every case the attacking commander made the decision that the military necessity of the attack outweighed any harm that might befall noncombatants. He proceeded with the attack because he believed any resultant collateral damage was worth risking for the potential military advantage he could gain. However, that type of categorization would not consider the practical causes of collateral damage that the following list contains:

1. Attacks pursued using the principle of proportionality
2. System inadequacies
3. Human error
4. Incomplete intelligence
5. Enemy defenses
6. Environmental conditions

7. Inadequate comprehension
8. Brute force

Attacks pursued using the principle of proportionality

The law of war emphasizes that the presence of civilians does not render a target immune from attack.⁶¹ Effective conduct of an air attack campaign can require placing enemy civilians and civilian property in jeopardy in order to achieve military objectives. As discussed in Chapter Two, the attacking commander must ensure his forces take reasonable precautions to minimize collateral damage consistent with mission accomplishment and risk to his forces. He also must weigh the military advantage gained against the likely collateral damage that may result. In effect, he may decide that collateral damage is certain to occur but the military gains are worth that cost. This is not an unlikely scenario.

One of modern warfare's fundamental problems is the commingling of civilians and civilian property with military personnel and objects. It is often difficult to discriminate between them. Additionally, in most modern nations many objects intended for civilian use also have military purposes. A bridge or a freeway crucial to daily business traffic can be just as vital to military traffic or a nation's support for its war effort. Airports and seaports can be equally important to civilian and military users. The same is true with regard to major utilities. Electric power grids can simultaneously serve both military and civilian purposes. Microwave towers can constitute an essential part of military command and control systems as well as peacetime civilian communications. Objects used concurrently for civilian and military purposes are open to attack if a military advantage will result. When discrimination is difficult, or when dual use provides

military benefit to the enemy, the attacking commander determines the proportional gain against the likely collateral damage. The likelihood of such damage may be a virtual certainty. The commander's decision to engage in such attacks is the cause of the resulting collateral damage.

During World War Two, the United States Army Air Forces espoused a policy of precision bombing on military or industrial targets while avoiding civilian areas. However, wartime realities intruded.⁶² Heavy bombers did not possess the accuracy to discriminate effectively between legitimate military targets and civilian areas.⁶³ There were several reasons for this: German fighter attacks reduced the length of bomb runs, antiaircraft artillery forced bombers to fly higher than planned, and clouds, smoke, and dust interfered with aiming. The bombing systems could not effectively separate war production industry and other military targets from the large residential centers where the populace lived and worked. The only method to destroy many vital military centers was area bombing. Cities came under extensive bombardment and many in Europe and Asia were substantially destroyed.⁶⁴ Allied commanders made the decision that the near certain collateral damage was proportionally acceptable when compared with the military advantage gained by the destruction of German war-production capacity.

Similarly, RAF attacks on the German hydroelectric dams on the Eder and the Mohne rivers in 1943 resulted in considerable collateral damage. These attacks caused damage to 125 factories, removed 3,000 hectares of farm land from the annual harvest, and killed 1,300 people, mostly noncombatants. The RAF's intent was to reduce the war production in the Ruhr industrial region, not to devastate the local civil populace.⁶⁵

However, British leaders judged the guaranteed collateral damage acceptable when compared to the potential harm brought to German war production.

System inadequacies

Regardless of the care and maintenance provided, aircraft and weapons will break and attack systems will be often inadequate to accomplish their assigned tasks. The high stresses of a combat environment increase the likelihood of failure in complex bombing systems. One may hope for an environment conducive to achieving “zero defects.” Malfunctions in the aircraft, the bomb-aiming system, or the weapons themselves, however, will cause some bombs to miss their targets. Although reliability is constantly improving, technological perfection remains elusive. The failure of military equipment and the inability of bombing systems to accomplish every mission are part of the fog and friction of war. Inevitably, the best-aimed laser-guided bomb will lose its lock on a target due to a steering mechanism failure and plunge into an orphanage or a hospital.

In April of 1944, American B-24 Liberators bombed the Swiss city of Schaffhausen, killing or injuring over 100 Swiss civilians. The lead bombardier’s bomb-aiming equipment had functioned only intermittently and while attempting to bomb over 8/10ths-cloud cover, failed completely. Believing his aircraft was over the correct target, he released his weapons and the rest of the formation bombed on his signal.⁶⁶

Operation Just Cause saw F-117 aircraft used to “stun and frighten Panamanian Defense Force” soldiers by bombing near their barracks.⁶⁷ The operational commander had requested the most accurate USAF aircraft in the inventory to minimize the potential for excessive military and civilian’s casualties. System limitations combined with pilot

error caused two laser-guided bombs to impact approximately 100 meters from the intended targets. High humidity and cloudy weather conditions prevented the pilots from utilizing their infra-red sensors until just before weapon release. This is a challenging and far from ideal situation for an air attack. To make matters worse, the lead pilot incorrectly identified his intended target then informed the trailing pilot that he had hit the correct target. This error caused the trailing pilot to place his bomb in a position relative to the lead pilot's bomb impact as the plan dictated. As a result, the second bomb also impacted far from the intended target. While no one reported any significant collateral damage from this incident, there is an important lesson involved. Commanders must consider system limitations in any planning scenario seeking to avoid collateral damage and in any analysis of failure. Other collateral damage causes—in this instance environmental factors and human error—can be exacerbated by system limitations.⁶⁸

Human error

As the previous examples show, human factors can have a significant role in any instance of collateral damage. The uncertainty and confusion inherent in war are factors which are very conducive to increasing the potential for human errors to occur. In March 1967, two American F-4C fighter-bombers flew an armed reconnaissance mission from Thailand. Their intent was to find North Vietnamese vehicles infiltrating through Laos. After determining their position by reference to radio beacons and landmarks, they dropped their bombs along a road that seemed likely to be a sanctuary for enemy trucks. Unfortunately, they had misinterpreted their position and actually placed their ordnance in the center of the village of Lang Vei, killing 100 South Vietnamese civilians and

wounding 250.⁶⁹ Similarly, in 1972, during US bombing in Cambodia, the force commander described how “a crewmember made an honest error, forgot to flip a switch and we killed a little over 100 people in one village some 15 miles from where the bombs were intended to fall.”⁷⁰ The same type of human error during Operation El Dorado Canyon resulted in 8,000 pounds of bombs lofted into a populated area of downtown Tripoli. The aircrew had selected an incorrect computer function and as a result placed their weapons a mile and a half long of the target.⁷¹

There are many reasons for human errors. One is that the technical skills of aircrews are not always up to the level of their assigned tasks. General Curtis LeMay said that the aircrews he commanded in the bombing of Japan in early 1945 were not well trained. He realized this would result in less accurate bombing than he desired, but he had few options other than allowing them “on-the-job training.”⁷² Perhaps a more salient reason for human error is the one made by a veteran of air combat over North Vietnam:

Those who have not delivered weapons from an airplane have little or no conception of the problems involved or the requisite skills. There are so many variables in the accuracy equation and the chance for error is so great as to make one wonder how [aircrews] do as well as they do.⁷³

Incomplete intelligence

Intelligence gathering and analysis attempt to reach a level of accuracy sufficient to conduct successful combat operations. The quality of intelligence can vary. When intelligence is less than adequate, the consequences can range from annoying to devastating. During the 1972 Linebacker operations over Vietnam, the only target

photographs available came from the 1967-68 campaigns. This was not unique since similar problems occurred during the previous Rolling Thunder operation.⁷⁴ While this was not critical to B-52 strikes, it greatly hampered F-4 aircrews using precision-guided weapons. The results of this intelligence inadequacy contrasts sharply with the devastating results of the Desert Storm attack on the Al-Firdos bunker in which scores of noncombatants died. In the latter instance, the nature of the intelligence provided to attack planners was incomplete. It did not provide all the information pertinent to approving the attack.

Leaders and commanders have to make decisions on the basis of their assessment of the information reasonably available to them at the time. An attacker hampered by a lack of adequate intelligence may make decisions that will lead to innocent civilian deaths. The varying quality of information available is difficult to control because the very nature of intelligence precludes perfection. For example, low-level strafing attacks on the transportation system in France and Belgium in the summer of 1944 inevitably killed many French and Belgian civilians who used that system or worked on or near it. There was no foolproof way to know the nationality of the people on the ground and so ensure that only German combatants were killed.⁷⁵

Enemy defenses

The accuracy required to destroy a target from the air is the end result of a long and expensive effort. It includes designing and producing aircraft and munitions as well as selecting and training aircrew. Therefore, it is an understatement to acknowledge that aircrew try to be as discriminate as possible when striking their intended targets. Enemy

defenses intend to disrupt that discrimination. The defender has accomplished his mission if he makes the attacker miss the target. For instance, Libyan defenders fired antiaircraft artillery at attacking aircraft during Operation El Dorado Canyon. They used tracer fire at night in the hope it would confuse the American aircrew and cause them to miss and strike anywhere but on the target.⁷⁶ Unfortunately, that tactic proved fatal to some civilian members of the Libyan populace.

Similarly, the use of electronic warfare can lead to collateral damage in two distinct ways. First, the electronic warfare actions of a defender can cause the attacker's bombs to miss the intended target and strike civilian areas. In May of 1941, the Luftwaffe sent nearly 100 bombers on a night attack against a city in northern England. The aircraft used ground-based radio beams to find their targets. The British jammed the radio signals which caused at least one attacker to bomb the city of Dublin in neutral Ireland, killing 34 civilians.⁷⁷ Second, electronic warfare measures used by an attacker can cause the defender's anti-air weapons to go awry. In a notable incident during the Linebacker I campaign, actress Jane Fonda visited Hanoi to show support for the North Vietnamese. The North Vietnamese photographed her standing in a large crater allegedly caused by a bomb from a B-52. The intended inference was that the attack had devastated a residential area. American photo analysis later determined conclusively that a North Vietnamese surface to air missile caused the crater.⁷⁸ The exact reason for the missile's failure is unknown but speculation about possible causes includes USAF electronic counter measures, missile design inadequacies, and mechanical failure.

Defenders use measures such as camouflage, dispersion of war materials, and anti-aircraft defenses to cause an attacking force to be less than precise. These measures can

also increase the risk to the defender's population. During Linebacker II bombing operations against North Vietnam, three B-52 aircraft attacked the Bach Mai Military Storage Complex. The crews planned an approach that avoided the Bach Mai hospital. As the third bomber crossed its bomb release line, two surface-to-air missiles struck it. As the aircraft lost control, some of its bombs separated from the weapons bay and exploded on the hospital.⁷⁹

Environmental conditions

The combat environment is crucial to the accuracy of air delivered weapons. It consists of weather, topography, vegetation, thermal radiation, time-of-day, atmospheric conditions, and a host of other factors. Attackers can do little to control the combat environment except to cancel missions until a satisfactory situation presents itself—a luxury not always permitted in war. The Vietnamese environment hampered the use of precision guided munitions during the Linebacker I and II campaigns. The jungle canopy, humidity, and rain degraded the aircraft and weapon sensors, which caused some bombs to miss the intended targets. These misses caused civilian casualties and damaged civilian property.⁸⁰ In one instance, four USAF F-4 fighter-bombers attacked the Hanoi Railway Station with laser-guided bombs. The first two Phantoms hit their targets precisely. The bomb from the third attacker missed, apparently because smoke from the previous explosions obscured the laser beam. The errant weapon struck the Cuban chancellery across the street from the notorious Hanoi Hilton prison.⁸¹

During World War Two, if allied aircrew were unable to see their primary or secondary targets in Germany due to weather conditions, they could attack any German town suspected of containing at least one military objective. Eighth Air Force directives

stated that any German town which was big enough to produce a return on the bomber's radar contained a large proportion of military targets and was open to attack.⁸²

Military commanders rarely have the luxury of fighting under ideal conditions. Adverse environmental conditions increase the probability of collateral damage despite the best efforts of the attacking force. Predicting these conditions is difficult. This is particularly true when trying to determine the conditions over a target at the time planned for attack. If military requirements necessitate the attack regardless of the conditions, then accuracy might suffer. During El Dorado Canyon, smoke from the explosions of a lead aircraft's bombs apparently obscured the sensors of a following aircraft. This happened because the actual wind direction was opposite from the forecast direction. The aircrew in the trailing aircraft, unable to fire their laser through the smoke, could not prevent their bombs from impacting short of the target.⁸³

Inadequate comprehension

When the warriors executing air attacks have inadequate comprehension of the intent underlying the operation, collateral damage can result. This poor understanding can cause lower echelons to take actions contrary to the intent of existing directives. For example, political or military leaders will often design rules of engagement (ROE) to ensure minimal collateral damage occurs. This was the case during the Vietnam War. Unfortunately, some aircrew either misunderstood or callously disregarded these directives. In that war, ROE called for the use of napalm to be "avoided unless absolutely necessary" when attacking enemy strongholds. In fact, there was extensive use of napalm. Estimates show US aircraft employed over 400,000 tons of it in South Vietnam

alone during the course of the war albeit usually not in urban areas. Despite such evidence, it is difficult to ascertain the full extent to which ROE were ignored throughout the term of that long war. Another comprehension problem occurred when the military used flawed procedures to determine whether civilians were present in the villages subject to bombing. Rules of engagement required officials to provide all civilians with the chance to leave their village prior to an attack. The South Vietnamese officials authorizing clearance for these attacks often did little to warn the civilians prior to approving the bombing.⁸⁴

Inadequate comprehension of the nature of some weapons can also cause collateral damage. The herbicides and defoliants used to hinder enemy infiltration in Vietnam caused physical disabilities to many people present during those operations. Military actions which produce no immediate discernible collateral damage might be the genesis of future collateral damage.

Brute force

Brute force encompasses the blatant disregard for whatever collateral damage may occur as a result of attacks on military targets. When belligerents realize that there is no particular penalty to pay for opening fire first or using any and all means of warfare—even the wholesale destruction of cities by bombing—then whatever self-imposed restraints existed tend to erode.⁸⁵ This is not the same as intentional attacks using the proportionality principle to rationalize harm to civilians and non-military objects. Despite the fact that the result may be the same in either case, the intent is very different.

The Soviet intervention in Afghanistan witnessed attacks on towns and villages by bombers and armed helicopters. Western observers and Afghan refugees reported flagrant disregard for civilian lives by the Soviets as they attacked residential areas and market places to reduce support for the rebels as well as eliminate their hiding places. Other Western travelers reported that high altitude bombing demolished much of the region around the capital city of Kabul.⁸⁶ Similarly, during the Spanish Civil War, the Italians deliberately bombed the city of Barcelona for three consecutive days in March 1938. The indiscriminate attacks, ordered by Italian leader Benito Mussolini, caused 2,000 plus casualties and considerable damage. The German Ambassador to the Nationalist Coalition allied with the Italians berated these attacks, describing them as “destructive bombardments without clear military targets.”⁸⁷

American leaders in World War Two expressed the belief that moral values precluded them from targeting noncombatants.⁸⁸ Most US airmen regarded civilian casualties as regrettable and an unintentional effect of bombing military targets. However, the results of the bombing generated considerable controversy among historians about the motivations involved. The argument was made that ethical codes “did little to discourage air attacks on German civilians.”⁸⁹ Some evidence suggests that in practice, “official policy against indiscriminate bombing was so broadly interpreted and so frequently breached as to become almost meaningless.”⁹⁰ A different interpretation of that evidence concluded that most American airmen “did the best they could to win the war with consistent application of a doctrine that favored military and industrial targeting over terror bombing.”⁹¹ It appears that as US losses mounted without obvious results, inhibitions faded and civilian targets came under attack on a grand scale.

This was especially true during the bombing of Japan. So, although almost every major figure associated with American bombing expressed concern about the moral issues involved, those concerns usually gave way to a decision that the military advantage gained through bombing outweighed the collateral damage certain to occur.

Conclusion

The attacking commander must weigh the potential for collateral damage against the military advantage he may gain from an attack. The above list of causes provides him with sufficient knowledge to avoid actions, which have historically resulted in collateral damage. If he cannot simply avoid similar actions, he can attempt to control, or at least manipulate the various causes and so decrease the likelihood of collateral damage. The next chapter will explore the consequences of collateral damage to determine when its occurrence or its potential for occurrence is important to USAF attack operations.

⁵⁹. Air Force Pamphlet (AFP) 110-34, *Commander's Handbook on the Law of Armed Conflict*, 25 July 1980, 3-3.

⁶⁰. Hays W. Parks, "Air War and the Law of War," *Air Force Law Review* (1990), 181.

⁶¹. Air Force Pamphlet (AFP) 200-18 vol. I, *Targeting Intelligence Handbook, Unclassified Targeting Principles*, 1 October 1990, 97.

⁶². Conrad C. Crane, *Bombs, Cities, and Civilians: American Airpower Strategy in World War II*, (Lawrence, Kansas: University Press of Kansas, 1993), 1, 2.

⁶³. Stephan L. McFarland, *America's Pursuit of Precision Bombing, 1910-1945* (Washington and London: Smithsonian Institution Press, 1995), 169.

⁶⁴. This was a precipitous drop from America's original intent. When World War Two started on September 1, 1939, President Franklin D. Roosevelt sent the following message to the warring nations:

“I am . . . addressing this urgent brief to every government which may be engaged in hostilities publicly to affirm its determination that its armed forces shall in no event, and under no circumstances, undertake the bombardment from the air of civilian populations or of unfortified cities.” See Parks, 36-37.

⁶⁵. Ibid., 204.

⁶⁶. Ibid., 189.

⁶⁷. “The Invasion of Panama: How Many Innocent Bystanders Perished?” Report of the Investigations Subcommittee of the Committee on Armed Services House of Representatives, 7 July 1992, 35-37.

⁶⁸. Ibid.

⁶⁹. John Schlight, *The War in South Vietnam: The Years of the Offensive, 1965-1968* (Washington DC: Office of Air Force History, 1988), 260.

⁷⁰. John W. Vogt, Commander in Chief, Pacific Air Forces, in a speech to the Honolulu Rotary Club, 4 December 1973, Air Force Historical Research Agency, K168.06-234, Dobin # 0571583, 13.

⁷¹. Robert E. Venkus, *Raid on Qaddafi: The Untold Story of History's Longest Fighter Mission by the Man Who Directed It* (New York: St. Martins Press, 1992), 80.

⁷². Parks, 184.

⁷³. Bernard Appel, Bombing Accuracy in a Combat Environment, *Air University Review*, July-August 1975, 40.

⁷⁴. Parks, 185.

⁷⁵. Ibid., 158.

⁷⁶. Ibid., 191.

⁷⁷. Ibid., 29.

⁷⁸. Ibid., 201.

⁷⁹. Ibid., 57.

⁸⁰. Gary S. Ziegler, "Weather Problems Affecting Use of Precision Guided Munitions," 32, *Naval War College Review*, May-June 1979, 95-106.

⁸¹. Parks, 194.

⁸². Ibid., 149.

⁸³. Venkus, 81.

⁸⁴. Stanley I. Kuter, ed., *Encyclopedia of the Vietnam War*, (New York: Charles Scribner's Sons, 1996), 483.

⁸⁵. Edward N. Luttwak, "Toward Post-Heroic Warfare," *Foreign Affairs*, vol. 74, May-June 95.

⁸⁶. "Tears, Blood, and Cries: Human Rights in Afghanistan Since the Invasion, 1979-1984," *A Helsinki Watch Report*, December 1984, 26-33.

⁸⁷. John Coverdale, *Italian Intervention in the Spanish Civil War* (Princeton, NJ: Princeton UP, 1975) 347-349 as cited in James S. Corum, "The Luftwaffe and the

Coalition Air War in Spain, 1936-1939,” in John Gooch, ed., *Airpower: Theory and Practice*, (London: Frank Cass, 1995), 85, 90.

⁸⁸. Wesley Frank Craven and James Lea Cates, eds., *The Army Air Forces in World War II*, 7 vols. (Chicago: University of Chicago Press, 1948-1953), 3: 638, 733.

⁸⁹. Ronald Schaffer, “American Military Ethics in World War II: The Bombing of German Civilians,” *Journal of American History* (September 1980), 319, and Schaffer, *Wings of Judgment: American Bombing in World War Two* (New York, Oxford, 1985), xii.

⁹⁰. Ibid.

⁹¹. Crane, 10.

Chapter 4

The Effect of Collateral Damage on USAF Operations

One mishap, one innocent civilian killed, one civilian wounded or one dwelling needlessly destroyed is one too many.

—General William C. Westmoreland

American leaders usually state their intention to minimize collateral damage whenever they commit US forces to combat. As discussed in Chapter Two, their concern stems from deeply held humanitarian and moral convictions about avoiding injury to innocent noncombatants as well as a desire to adhere to the law of war. There are also other, more practical concerns. These include the desire to maintain domestic and international support as well as sustaining local popular support for any friendly governments being aided. Instances of collateral damage may be detrimental to each of these concerns. Each instance will produce different reactions from the concerned parties depending on circumstances such as the amount of damage, the effort made to avoid damage, and the contextual factors involved. Therefore, when American leaders approve the use of force, it is usually with the caveat that collateral damage must be minimal. When given such direction, the USAF will usually constrain itself with self-imposed restrictions related to the conduct of operations during the conflict. These restrictions

will often hinder the USAF's ability to conduct operations in the most militarily efficient manner because efforts to minimize collateral damage limit the available options.

Reduced Military Efficiency

American leaders and military commanders must understand two aspects of collateral damage: first, despite taking steps to minimize it, collateral damage is almost inevitable; and second, the efforts to minimize collateral damage will detract from the most efficient methods of conducting operations.

It is extremely difficult to eliminate collateral damage from attack operations. While many missions may occur without incident, the causes identified in Chapter Three are liable to produce collateral damage on any given sortie. The longer a conflict's duration and the more numerous the attacks, the greater the likelihood that one or more of the weapons employed will eventually produce noncombatant injuries or civilian property damage. There is scant historical evidence showing any USAF ability to completely eliminate collateral damage despite the frequently uttered intentions of senior leaders about minimizing it. Therefore, attack operations imply a commander's willingness to accept the consequences of any resultant collateral damage.

When leaders decide to use airpower, the mere possibility of collateral damage forces the USAF to make choices between efficient operations and minimizing collateral damage. Prior to any attack, commanders choose the most efficient method of conducting operations within the constraints of minimizing collateral damage. The manner chosen must not undermine the above listed concerns of American decision-makers. The commander's choice is a trade-off between the best manner in which to

conduct militarily efficient operations versus the emphasis placed on minimizing collateral damage. He considers the likelihood that the less efficient methods which lower the risk of collateral damage might result in a longer war with greater military and civilian casualties and damage. Once he has his plan designed, he establishes combat procedures in-line with his vision of efficiency while striving not to exceed the acceptable level of collateral damage.

The nature and context of the conflict at hand influences the degree of emphasis that American decision-makers place on minimizing collateral damage. When these decision-makers choose to use airpower, this same degree of emphasis influences the attack methods the USAF will employ. The methods of employing airpower can produce polar opposite results. This is evident when contrasting such operations as the firebombing of Japanese cities in the summer of 1945 with the outcome of the restrictive NATO air operation Deliberate Force over Bosnia in 1995. In the former, the choice to attack dispersed Japanese industry by bombing cities resulted in the deaths of over 300,000 people.⁹² In the latter, restrictive employment methods kept the death toll to less than 30 people.⁹³ Of course, the length and intensity of each operation, as well as the number of weapons employed, were not at all similar and neither was the emphasis placed on avoiding collateral damage. The methods chosen are a primary factor in the probability and the amount of collateral damage occurring. However, the emphasis placed on minimizing collateral damage is by no means the only factor influencing the choice of attack methods. Every situation will have numerous influences including elements as diverse as the capabilities of the enemy, the targets selected, and the technology available.

Limited Options

The causes of collateral damage discussed in Chapter 3 highlight its near inevitability. This high potential for occurrence affects USAF operations when American decision-makers choose not to use some of the options airpower provides. These decision-makers might be unwilling to employ the full capability of airpower in some situations because they fear the consequences of collateral damage. One consequence is that the damage might be a factor contributing to the escalation of the conflict. Escalation usually results in an increase in the number of military and civilian casualties to all the belligerents.

The desire to avoid escalation of the Vietnam War caused US leaders to shun certain military options. Among these were recommendations that the US military bomb the dike system in North Vietnam, rejected by President Lyndon Johnson. Destroying parts of this system would have hampered transportation in the country as well as devastated the rice harvest which provided food for North Vietnamese civilians and soldiers. Johnson feared the “grave risk of Communist China or even Soviet involvement if those measures were carried out,” and desired to “avoid heavy civilian casualties that would accompany destruction of the dikes.”⁹⁴ President Richard Nixon similarly rejected attacking the dike system. In his words, “the resulting floods would have killed thousands of civilians.” Despite this, he believed the only way to end the war, short of using tactical nuclear weapons, was by attacking the dikes.⁹⁵

Collateral damage is a consideration to American leaders even when other concerns about a conflict are seemingly more important. Moral considerations about collateral damage influenced John F. Kennedy’s administration to reject an airpower option during

the Cuban missile crisis. Members of the president's inner circle "could not accept the idea that the United States would rain bombs on Cuba, killing thousands and thousands of civilians in a surprise attack."⁹⁶ Kennedy's advisers spent many hours trying to devise a way to warn the Cuban population yet not compromise the effectiveness of such an attack. The inability to solve this problem and the belief that "a surprise attack would erode, if not destroy, the moral position of the US throughout the world," in part persuaded the President to abandon that option.⁹⁷

Challenges to Support

When America becomes involved in a military operation, whether it is a peace operation, a declared war, or something in between, one of its leaders' primary concerns is the maintenance of domestic support for continued US involvement. A president must have the tacit support of his own people to retain the options necessary to successfully deal with most situations. An effective way to maintain this support is through demonstrating a commitment to conducting operations in a moral and just manner. This commitment can be difficult to justify to the American people following instances of collateral damage. President Nixon understood that certain actions required domestic support, so he rejected bombing the dikes in North Vietnam because of the guaranteed civilian casualties as well as "the domestic . . . uproar that would have accompanied the use of [this] knockout blow."⁹⁸

Maintaining international support for US actions, especially among allies and coalition members, also motivates American leaders to minimize collateral damage. One of the Johnson administration's prime arguments for not expanding the bombing of

North Vietnam was the probable cost to the US in terms of world opinion. That opinion was likely to be negative due to the civilian casualties the bombing would probably produce. The Department of Defense summarized this argument in a May 1968 memorandum. That document depicted the US, the world's greatest superpower, as willfully inflicting hundreds of noncombatant casualties every week of the war. These casualties were the result of an attempt to pound a tiny backward nation into submission about an issue whose merits were hotly disputed.⁹⁹ This was not a pretty picture.

Similarly, during Operation Provide Comfort in 1993, punitive USAF attacks on an Iraqi industrial complex and the national intelligence headquarters challenged the political cohesion of the operation's Coalition. Cruise missile attacks by US Navy ships killed or wounded 38 civilians. Attacks by Coalition aircraft produced no reported collateral damage. While both attacks were separate from Provide Comfort, they caused negative reactions from some Coalition governments. France, despite providing aircraft for the bombing raids, criticized the cruise missile attacks as disproportionately severe. Members of the British Parliament voiced opposition to military intervention. Both Coalition allies were critical mainly because of the resultant civilian casualties not because of the nature of the response.¹⁰⁰

Restrictive Rules of Engagement

The potential for collateral damage encourages US forces to adopt rules of engagement (ROE) and other precautionary measures designed (among other purposes) to limit whatever collateral damage might occur. These rules are directives issued by higher civilian or military authorities, which provide detailed guidance about the actual planning,

and conduct of operations. Commanders, planners, control personnel, and combat crewmembers must follow these directives. ROE are tailored to the situation at hand and the forces used. The restrictions imposed by ROE may constrain the most efficient methods of conducting combat missions. For example, former Secretary of Defense Casper Weinberger conceded that Operation El Dorado Canyon's strict ROE, which demanded fully operational weapon delivery systems, was a major factor in that raid's limited success in striking targets.¹⁰¹ ROE influence the occurrence of collateral damage by attempting to ensure that the USAF (or other service) conducts operations in a manner compatible with humanitarian standards whenever possible.

The airmen constrained by these ROE do not always understand the rationale for imposing them. Airpower historian Robert Futrell describes how during the Korean War the restrictions stemming from United Nations' "humanitarian motives were not precisely defined but were usually manifest by some higher authority's disapproval of suggested operations."¹⁰² Early in that war, President Truman prohibited "indiscriminate" bombing of North Korea and ordered the Air Force to restrict its attacks to "purely military targets."¹⁰³ This policy limited US bombing operations. Not only did aircrew have to drop leaflets to warn civilians to flee industrial areas before any attack, but also the ROE prohibited the B-29s used in the bombing from employing the preferred incendiary munitions. Additionally, higher headquarters usually disapproved massed air attacks if there was even a remote possibility that the media might perceive the attack as targeted against North Korean civilians.

The restraints mentioned above depict some of the consequences of the initial concern about collateral damage during the Korean War. This contrasts with the

remainder of the war during which the US Far East Air Force had a great deal of latitude in operations. Most targets were open to attack, even military installations in the capital of Pyongyang. The enemy could not use populated areas as sanctuaries to shelter military supplies or troops. When intelligence units discovered these caches, hordes of bombers would “drop incendiary and delay-fuzed bombs on the towns and villages sheltering Red supplies.”¹⁰⁴

The Vietnam War witnessed more restrictive ROE than the Korean War because of the greater concern by the US to limit noncombatant casualties. There are several likely reasons for this. First, the fighting in Vietnam was much more unconventional and the issue of aggression was not as clear as it was in Korea.¹⁰⁵ Also, President Johnson feared that US actions in Vietnam might cause direct Chinese or Soviet intervention if it appeared those actions disproportionately harmed the Vietnamese communists. Additionally, the media was pervasive in their coverage of almost all US operations. Finally, the Vietnamese Communists were far more skilled at political warfare and manipulating world opinion through propaganda than were the Koreans.¹⁰⁶

The ROE implemented to minimize collateral damage severely constrained USAF attacks against North Vietnam, especially during the Johnson administration. The aforementioned fear of possible Soviet or Chinese intervention motivated many of the restrictions. Other constraints stemmed from the eagerness of American decision makers to avoid alienating US domestic or international opinion.¹⁰⁷ During the Rolling Thunder campaign, President Johnson chose the minimization of civilian casualties as the standard for target selection. The resultant ROE placed severe limitations on all strikes against targets in heavily populated areas. They also restricted surface-to-air-missile suppression

and prohibited attacks in bad weather.¹⁰⁸ As the campaign continued, the target selection criteria grew more restrictive with Johnson ultimately approving attacks only on those guaranteeing a minimum of civilian casualties.

One of the reasons for minimizing collateral damage is the desire to sustain local support for the friendly government in whose territory the US may conduct operations. In South Vietnam, commanders tried to establish ROE and combat procedures to avoid harm to noncombatants.¹⁰⁹ For example, procedures required forward air controllers (FAC) to control air attacks in all areas where civilians were present. South Vietnamese officers on the scene usually provided authorization for the attack.¹¹⁰ Additionally, in Laos, the US embassy prohibited any air strikes close to populated areas and required Laotian officers to validate attacks authorized by FACs. Even in attacks against the Ho Chi Minh trail, the embassy restricted attacks to “200 yards either side of the road” unless the Laotians approved the strike.¹¹¹

Washington decision-makers often required estimates of Vietnamese civilian casualties that might result from proposed air strikes. If the figures were too high, Washington would not release the targets for attack.¹¹² The commander of Seventh Air Force in Vietnam, General William M. Momyer, believed that “the pressure to hold down damage to civilian targets prevented missions that would have been run in World War II and Korea.”¹¹³ When higher authorities did approve attacks against targets in populated areas, local commanders had to create ROE to minimize collateral damage. For example, the June 1966 raids against oil storage facilities near Hanoi and Haiphong required that the attackers:

Execute strikes only under optimum weather conditions, with good visibility and no cloud cover; make maximum use of experienced Rolling Thunder pilots; select a single axis of attack that would avoid populated areas; make maximum use of ECM (electronic counter measures to hamper SAM and AA antiaircraft) fire control, in order to limit pilot destruction and improve bombing accuracy; make maximum use of high-precision delivery munitions consistent with mission objectives; ensure minimum risk to third-country nationals and shipping; and limit SAM/AA suppression to sites outside populated areas.¹¹⁴

Such ROE demonstrated substantial disregard for the risk to the attacking force.¹¹⁵

This was a symptom of self-imposed constraints on US actions. As previously stated, American leaders hoped to avoid doing anything which might have provoked direct Soviet or Chinese involvement in the war. The fear of escalation to another world war colored most decisions about the use of military force.

Throughout Rolling Thunder, aircrew risked their own lives in cautious attempts to avoid populated areas and civilian casualties.¹¹⁶ The USAF lost numerous aircraft because ROE required approach courses and other tactics to reduce the likelihood of civilian casualties rather than providing the best protection to the attackers.¹¹⁷ The extreme precautions often required US aircraft “to follow perilous, circuitous routes that exposed them much longer than necessary to enemy anti-aircraft fire.”¹¹⁸

There were also constraints placed on operations to hold down the number of US casualties. For example, during Rolling Thunder, President Johnson insisted that commanders “weigh heavily in each case whether US losses might be excessive” when striking North Vietnam. Civilian officials disapproved many targets when they believed them to be not worth the cost in American lives. However, the desire to avoid civilian casualties and prevent escalation of the war outweighed the effort to limit losses in the air campaign. Even with all these restrictions, substantial collateral damage occurred.¹¹⁹

Increased Restrictions

The occurrence of collateral damage is usually not immediately apparent. Bomb damage assessment after an airborne attack is a difficult task. On-board cameras might depict the target struck but usually from a distance and only for a short duration. Subsequent reconnaissance efforts can provide a better indication of the damage caused but cannot easily reveal casualties. The government of the enemy nation usually reports civilian deaths and injuries. That government will have a motive to exaggerate the number of casualties and the amount of damage for propaganda purposes. Third party officials or media members may provide some objectivity about the actual results of the attack or perhaps they will exaggerate the level of damage suffered. Complete details often become clear only after the conflict ends.

When the USAF confirms that actual collateral damage has occurred, its response is dependent on the cause, the specific people injured, the number and type of casualties, the amount of damage, and the reaction of the domestic and international audiences. With so many influencing factors, it is difficult to ascertain a uniform USAF response. One certainty is that the USAF will examine all planning and attack procedures to determine any needed changes. This examination, as well as the nature and the context of the war, will determine if US leaders and military commanders continue to pursue the air campaign as before or if they will change certain practices. One possible response is to implement a more restrictive set of ROE or to invoke a more conservative interpretation of existing ROE.

When collateral damage does occur, commanders may implement even greater restrictions on the type and method of operations by tightening the ROE. Throughout the

US air campaign against North Vietnam, the Communists alleged indiscriminate US bombing of civilian residential areas, the Red River dike system, hospitals, and other non-military targets. The international media gave these claims wide dissemination but actual substantiation of injuries or damage was rare. Perhaps Washington authorities were occasionally aware of the authenticity of some of the claims despite the wartime rhetoric used to make them. Some claims apparently had enough credibility that US authorities imposed additional restrictions on the bombing campaign. For example, after the North Vietnamese “accused the United States of blatantly attacking civilian structures and of causing substantial civilian casualties” during air strikes in December 1966 against a Hanoi rail yard and depot, Washington required presidential approval of all attacks within 10 miles of Hanoi.¹²⁰

Similarly, senior leaders imposed restrictions on bombing attacks in Baghdad during Desert Storm after an F-117 strike on the Al-Firdos bunker killed many noncombatants. For the following four days all air operations against Baghdad ceased, and when resumed, politically motivated controls reduced the number of targets to the barest minimum.¹²¹

Enemy Exploitation

Military targets are not immune from attack just because of their location in a populated area. However, depending on the nature of the conflict, US leaders may discourage or prohibit attacks on such targets because of the possibility that a less than perfect attack could result in collateral damage. Potential adversaries are aware of US concerns about inflicting collateral damage and will attempt to exploit that as a weakness. They are likely to construct high-value targets in populated areas or encourage urban

growth around existing targets. The USAF learned this at the cost of many aircraft and American lives during the Rolling Thunder campaign conducted against North Vietnam. At the onset of that campaign, Secretary of Defense Robert McNamara prohibited attacks on targets located in populated areas and personally selected all fixed targets authorized for attack. He intentionally excluded attacks on many antiaircraft gun and missile sites. As the communists became aware that most urban areas were off-limits to US air strikes they began to store war material, park military convoys, and locate air defense sites (fighter aircraft, anti-aircraft guns, and surface-to-air missile sites) in populated areas. They routinely stored their military supplies in the residential areas of Hanoi and Haiphong as well as villages and cities along their transportation network.¹²² Schools, hospitals, and dikes became the storage sites for large stocks of military supplies.¹²³ These actions made all those supplies immune from attack under the restrictions established and openly publicized by McNamara. Unquestionably, the North Vietnamese exploited the restrictive US bombing ROE to further their own war effort.

An enemy can exploit American reluctance about causing collateral damage in other ways. If they can garner the sympathy of certain media groups, news releases can significantly undermine support for military actions by exploiting instances of collateral damage. For example, during Linebacker II over North Vietnam, the errant bombs of a crippled B-52 damaged a small part of the Bac Mai Hospital. Following this incident, a cry arose not only from Hanoi but from much of the world press as well. The media reports made no mention that the hospital was next to a primary North Vietnamese fighter base. They also did not raise the possibility that a stray North Vietnamese surface-to-air missile might have caused the damage. Certainly no one made the point that the USAF

could have legally targeted the hospital since anti-aircraft guns were positioned on its roof and grounds.¹²⁴

This intentional commingling of the enemy armed forces with noncombatants makes friendly forces choose between inaction and taking actions guaranteed to inflict collateral damage. The enemy is counting on American reluctance to harm noncombatants to force a selection of doing nothing. This occurred in Somalia where almost every mission during Operation Restore Hope required operating in cities or civilian areas.¹²⁵ Likely hostile forces mixed with civilians creating a high potential for collateral damage. Only individual judgment could separate friend from foe.

This type of environment presents an additional problem for airpower. When friendly forces identify appropriate targets for airpower, the destructiveness of the available weapons is often overwhelming.¹²⁶ Despite the availability of appropriate targets, the large of amount of firepower these aircraft possess may make it impossible to avoid collateral damage in an urban setting or in an area where the enemy operates close to noncombatants.

If a defender has failed to separate the civilian population from military objectives, he has made a conscious decision to leave them at risk. American ability to produce very precise destruction will do little to dissuade an antagonist who knows our policies might prohibit us from intentionally inflicting civilian casualties. This intentional lack of separation is both a cause of collateral damage and an effect of the concern we exhibit about it. Unfortunately, due to this concern, more and more might we discover enemy military facilities mixed together with civilian populations.

⁹². Conrad C. Crane, *Bombs, Cities, and Civilians: American Airpower Strategy in World War II* (Lawrence, Kansas, University Press of Kansas, 1983), 140.

⁹³. The Red Cross attributes these deaths to attacks on militarily significant targets. See International Committee of the Red Cross, “ICRC Report on certain aspects of the conduct of hostilities and the consequences from a humanitarian point of view of NATO airstrikes . . . ,” November 1994.

⁹⁴. Lyndon B. Johnson, *The Vantage Point* (New York: Holt, Rinehart and Winston, 1971), 369.

⁹⁵. Richard M. Nixon, *The Memoirs of Richard Nixon* (New York: Grosset and Dunlap, 1978), 347.

⁹⁶. Robert F. Kennedy, *Thirteen Days: A Memoir of the Cuban Missile Crisis* (New York: W.W. Norton and Company Inc., 1971), 15.

⁹⁷. Theodore C. Sorensen, *Kennedy* (New York: Harper and Row, 1965), 684-685.

⁹⁸. Nixon, 347.

⁹⁹. *The Pentagon Papers*, Senator Gravel Edition, Vol. 4, (Boston: Beacon Press, undated), 251.

¹⁰⁰. “Iraq Declares Cease-Fire After More Attacks by US, Allies,” and “US Missile Attack Targets Iraqi Intelligence Agency; Baghdad Raid Retaliates for Bush Death Plot,” *Facts on File Yearbook*, 1993, 29, 481.

¹⁰¹. Casper W. Weinberger, *Fighting for Peace* (New York: Warner Books, 1990), 198.

¹⁰². Robert F. Futrell, *The United States Air Force in Korea, 1950-1953*

(Washington DC: Office of Air Force History, 1983), 42.

¹⁰³. Ibid., 41.

¹⁰⁴. Ibid., 41-42, 178-181, 186, 208-209, 480-481.

¹⁰⁵. In 1965, Secretary of State Dean Rusk said that from the standpoint of US public opinion “the issue of aggression was ‘not clear’: the troops that were coming in were not coming in ‘in formation’ as had been the case in Korea.” Stephen T. Hosmer, *Constraints on US Military Strategies in Past Third World Conflicts*, RAND, July 1984, 67.

¹⁰⁶. Ibid.

¹⁰⁷. Admiral Sharp believes that the Johnson administration had an “obsession” with civilian casualties and was too sensitive “to reactions of other nations and the media.” Sharp’s solution to this “civilian-casualty obsession” was simple. “Once the decision is made to use military power to settle a political issue, that power should be used to its full effectiveness to get the war over as quickly as possible. All other considerations should be secondary. *That is the way to reduce civilian and military casualties.*” (emphasis in the original). Ulysses S. Grant Sharp, *Strategy for Defeat: Vietnam in Retrospect* (San Rafael, CA: Presidio Press, 1978), 128-129.

¹⁰⁸. William C. Momoyer, *Air Power in Three Wars* (Department of the Air Force, Air University, Maxwell Air Force Base, Alabama, 1978), 133-134, 176-177, 227.

¹⁰⁹. The US was often accused of using excessive firepower in South Vietnam. Among the criticisms was the use of napalm, herbicides, harassment and interdiction fire, and for generating large numbers of refugees. For a discussion on the rules of

engagement see William C. Westmoreland, *A Soldier Reports* (Garden City, New York: Doubleday and Company, Inc., 1976), 286-287; and Guenter Lewy, *America in Vietnam* (New York: Oxford University Press, 1981), 52, 62-65, 99-102, 233-234, 263-264; as cited in Hosmer, 68.

¹¹⁰. Stanley I. Kuter, ed., *Encyclopedia of the Vietnam War* (New York: Charles Scribner's Sons, 1996), 483.

¹¹¹. Momoyer, 86, 196, 266-269, 278.

¹¹². Sharp, 127-128.

¹¹³. Momoyer, 179, 188.

¹¹⁴. W. Hays Parks, "Rolling Thunder and the Law of War," *Air University Review*, Vol. 33, No. 2, Jan-Feb 1982, 14.

¹¹⁵. Ibid., 16-22.

¹¹⁶. Lewy, 403.

¹¹⁷. The USAF placed restrictions on itself to reduce civilian casualties: fighter aircraft could attack only during weather conditions having good visibility and minimal cloud cover so targets were easy to identify. This forced pilots to fly at altitudes lower than they preferred placing them in positions more vulnerable to enemy defenses. Sharp, 118.

¹¹⁸. Momoyer, 176-177.

¹¹⁹. Hearings before the Preparedness Investigating Subcommittee of the Committee on Armed Services, Air War Against North Vietnam, 90th Congress, 1st Session,

USGPO, Washington, 1967, 100, 278, 282, 291-292, 294-295, 303-304, 328, 333, 348.

As cited in Hosmer, 75.

¹²⁰. The Pentagon Papers, 135. Sharp, 122-123. Parks, 2-30.

¹²¹. Rick Atkinson, *Crusade: The Untold Story of the Persian Gulf War* (Boston: Houghton Mifflin Company, 1993), 290-296.

¹²². Reconnaissance imagery often depicted “vehicles lined bumper to bumper” and supplies “stacked on each side of the street” in the residential parts of Hanoi and Haiphong. Momyer, 188.

¹²³. Hays W. Parks, “Air War and the Law of War,” *Air Force Law Review* (1990) 140.

¹²⁴. Earl H. Tilford, Jr., *Setup: What the Air Force Did in Vietnam and Why* (Air University Press, 1991), 292.

¹²⁵. US Army Forces Somalia, 10th Mountain Division After Action Report, undated, 7.

¹²⁶. This was aptly demonstrated by a Cobra helicopter attacking a rocket launcher parked in a crowded neighborhood. The Cobra fired two missiles one of which hit the target while the other struck a nearby shop wounding 12 civilians. “US Aircraft, UN Forces Attack Somali Warlord: Pakistani Troops Fire on Protesters,” *Facts on File Yearbook, 1993*, 441.

Chapter 5

USAF Efforts to Minimize Collateral Damage in Desert Storm

I would say to the people of Iraq the safest place for them at night is home in their beds, because we're not bombing neighborhoods.

—General Tom Kelly

The Coalition opposing Iraq in Operation Desert Storm put forth a concerted effort to adhere to the requirements of the law of war. The United States Central Command (CENTCOM) controlled the American military forces in the operation. CENTCOM led the Coalition in developing procedures to minimize the risk of injury to noncombatants as well as destruction of civilian property. The CENTCOM Commander, General Norman Schwarzkopf, stated as much when he said that “we have the capability” to avoid collateral damage, “therefore, if we have the capability, this Coalition . . . [has] deliberately determined to use that capability to limit damage against innocent people.”¹²⁷ Coalition air forces accomplished this with a discriminating target selection process and a careful matching of weapon systems to selected targets and Iraqi defenses. For instance, when attacking targets in populated areas, planners selected specific types of aircraft and munitions that would provide the best possible weapon delivery accuracy. These choices reduced the risk of damage and injury to civilian objects and the civilian populace. Mission planners did this to the degree practical and with due consideration for an acceptable level of risk to the attacking aircraft and aircrews. Coalition forces avoided

several targets for the simple reason that the value of the destruction of the target did not outweigh the degree of risk to nearby civilians. Coalition members took these actions despite Iraqi violations of its own obligations under the law of war regarding its civilian population and property.

Planning

Forming the Coalition aided the fight against Iraq. The Coalition included immense US firepower, small but high-quality ground and air forces from Britain and France, as well as naval and transportation contingents from several NATO countries. It also contained Arab political allies like Syria and Egypt to help legitimize what were essentially a Western assault on an Arab nation. Logistical allies such as Saudi Arabia (who also provided combat forces) and Turkey allowed the assembly of forces within the theater. Maintaining consensus within such a diverse group is challenging. One of the means of confronting this challenge was in emphasizing the need to minimize collateral damage. Limited casualties to noncombatants would eliminate one possible source of disharmony within the Coalition particularly between the Western and Arab elements.

Along similar lines, the US-led Coalition had limited objectives. President George Bush expressed America's policy within a week of Iraq's invasion: "the unconditional withdrawal of all Iraqi forces from Kuwait; the restoration of Kuwait's legitimate government; a guarantee of the safety and protection of American citizens abroad; and the enhancement of security and stability of Saudi Arabia and the Persian Gulf."¹²⁸ The toppling of Saddam's regime was not a war aim. Most of America's allies, European and Arab, opposed broadening the war. The objectives of the war limited the cost the

Coalition was willing to exact from Iraq. Excessive collateral damage would be inconsistent with these objectives.

Coalition planners recognized that the air campaign would cause unavoidable hardship for the Iraqi people. For example, it was impossible to disrupt the electrical supply to Iraqi command and control facilities or chemical weapons factories while leaving unaffected the electricity supply to the general populace. Additionally, planners recognized that some collateral damage would occur because plans would go awry, errors would occur, and not every weapon would function as expected. With this in mind, targeting policy was to make every reasonable effort to lower the likelihood of collateral damage. As a part of this effort, aircraft would use only precision guided munitions (PGM) when attacking almost all targets in urban areas. This would help avoid damage to adjacent civilian structures.¹²⁹

Coalition planners were aware that every bomb had a potential moral and political effect. This was an important consideration given the context of Desert Storm. Airpower planners were cognizant of Iraq's rich cultural and religious heritage dating back several thousand years. This legacy left within Iraq's borders thousands of archaeological sites constructed throughout the evolution of modern civilization. To protect this legacy, Coalition air targeting policy dictated that planned attacks not only avoid civilians and civilian facilities, but also avoid any damage to mosques, religious shrines, and archaeological sites. While this policy might be enacted in any US-led operation, in this war it was a function of the nature of the Coalition and the nature of the war. The many Islamic states in the Coalition would probably take a dim view of attacks harming mosques, so there was little question of emphasizing the need to protect those sites.

Additionally, the war never reached a point where the Coalition was seriously endangered by Iraq. Therefore, the Coalition could choose to forego attacks on military targets when collateral damage to mosques and similar sites might result.

During the war, it became apparent that the Iraqis were moving some of their command and control functions into protected sites.¹³⁰ Such actions made those sites legitimate military targets under the law of war. Despite this, a CENTCOM spokesman stated that the Coalition would not target schools or mosques even if they contained legitimate military objectives.¹³¹ President Bush confirmed this by saying that Coalition forces were going to “unprecedented lengths to avoid destroying civilian and religious sites.”¹³² The potential political effects of collateral damage sometimes outweighed the military value of target destruction.

To aid mission planners attempting to determine the negative effects of air attack, CENTCOM target intelligence analysts coordinated with national intelligence agencies and the US State Department to produce an “off-limits” target list. This compilation defined which historical, archaeological, economic, religious, and politically sensitive installations in Iraq and Kuwait were not open to attack.¹³³ Additionally, planners scrutinized a six-mile area around each potential urban target for schools, hospitals, and mosques in order to identify which targets required extreme care in planning and executing an attack. They utilized imagery, tourist maps, and human resource intelligence reports in this examination. If targeting officers decided the likelihood of collateral damage was too high, they did not place the target on the attack list. Only when a target met all the desired criteria about collateral damage was it included on the list.

Coalition forces would eventually attack the target based on its priority relative to other targets as well as the availability of attack assets.¹³⁴

Coalition planners had stringent procedures and rules of engagement to follow when planning attacks. Planners carefully determined the type of aircraft and munitions, the time and direction of attack, and the desired point of impact for each target. Planned routes minimized the effects of weapons which missed their target and normally only cruise missiles or aircraft with PGMs attacked in built-up or populated areas. Attack procedures in populated areas specified that the aircrew could not deliver their weapons unless they positively identified the target and were reasonably confident the weapons would guide properly. If this was not possible, the aircrew was to attack secondary targets (using the same restrictions) or return to base with their munitions. When targeting dual-use (military and civilian) facilities, the attack usually came at night when fewer workers were likely to be present in and around the buildings.¹³⁵ Support aircraft usually accompanied attacking aircraft to help reduce any distraction from the attacker's assigned task. These support aircraft ensured air superiority and suppressed anti-aircraft defenses so neither enemy aircraft nor surface-to-air missiles were likely to interfere with the attackers.

Specialized planning for attacks against weapons of mass destruction also took place. Shortly before the air war began, an American team attempted to determine the most effective way to attack Iraq's arsenal of chemical and biological weapons. The team conducted several experiments, trying to find a way to destroy these weapons without releasing any toxic agents or causing significant collateral damage. They settled on a method of timed attacks utilizing specific munitions, which would minimize the chance

for toxins to spread. As a result of this planning, there were no toxins or agents detected after the subsequent attacks and no initial indications of chemical or biological collateral damage.¹³⁶ Attacks on nuclear research and production facilities yielded similar results although many sites escaped attack because mission planners did not know of their existence.¹³⁷

Coalition air forces were not alone in their planning to minimize collateral damage. Commanders chose the scheme of maneuver for the ground campaign with an eye toward avoiding populated areas. If it did not, then logically Iraqi civilian casualties and damage to civilian objects would have been high. The possibility of this scenario was a factor in deciding against a Marine amphibious assault into Kuwait City. Such an assault included the possibility of massive collateral damage to Kuwaiti territory from naval gun fire and air strikes against Iraqi fortifications. Significant destruction of Kuwaiti infrastructure might result from pre-assault operations alone. As a result of these and other considerations (such as deceptive cover for the actual “left hook” maneuver), CINCCENT decided to exclude the amphibious assault from the initial ground attack.¹³⁸

Instances of Collateral Damage

On the first day of the air war, General Colin Powell, Chairman of the Joint Chiefs of Staff, stated there would be “very tight control to minimize collateral civilian damage.”

¹³⁹From the start, Coalition objectives spelled out a clear distinction between Saddam Hussein’s regime and the Iraqi populace.¹⁴⁰ One of the intents of the careful targeting and use of PGMs was to minimize collateral damage and demonstrate the policy that Saddam and his military machine, not the Iraqi people, were the enemy.

Despite conducting an extremely discriminating air campaign, Coalition air forces could not avoid inflicting some collateral damage. The commander of the Coalition air war, Lieutenant General Charles Horner, said after the war, “I don’t know how you conduct any kind of military operation and not have innocents injured . . . if Iraq says I’ve injured a civilian, I’ll have to accept, yes, that’s probably true, because that’s part of war. Have I tried my utmost to keep from injuring civilians? Absolutely.”¹⁴¹

The USAF was the predominant player in the air war. US aircraft flew 88 percent of the more than 46,000 Coalition attack sorties and the USAF alone flew 60 percent of the total.¹⁴² USAF aircraft employed 81 percent of the 10,468 guided bombs and 97 percent of the 7,659 air-to-surface missiles. Coalition aircraft expended over 88,000 tons of munitions on Iraq and occupied Kuwait, of which 93 percent were unguided “dumb bombs.” Many of these fell from high altitudes in high winds where imprecision was inevitable. Despite this imprecision and the fact that 75 per cent of the dumb bombs missed their targets, they probably caused relatively little collateral damage because few of these type of munitions were expended in civilian areas. It is difficult to assess the success rate of PGMs striking their intended targets. Success criteria can vary and much of the data required to make such an assessment remains classified. However, given the numbers of USAF sorties flown as well as the amount of PGMs employed in urban areas, it is likely we had a role in causing much of the collateral damage.¹⁴³

Coalition planners assert that the principle of “military necessity” guided the selection of targets. Attack aircraft only went against targets with military value. However, this included widespread attacks on civilian infrastructure: the electrical supply, transportation, communications, oil production and storage, and many

governmental functions. The USAF described these targets as “vital to any nation’s ability to use military power.”¹⁴⁴

Many objectives, such as elements of transportation and communication infrastructure intended for civilian use also had a military function. Experience in its 1980-1988 war with Iran caused the Iraqi government to build a substantial degree of redundancy into its civilian utilities as a back-up for national defense purposes. By necessity, a large amount of this redundancy was in urban areas. Attacks on these targets were obviously dangerous to civilians living or working nearby. While many civilians left Baghdad voluntarily at the start of the bombing, Iraqi authorities chose not to evacuate the populace during the war. Speculation might conclude that this was to increase the risk of collateral damage and so win a propaganda victory. Whether that is true or not, this decision increased the level of risk to civilians during attacks against legitimate military targets despite the efforts of the Coalition.

In certain situations collateral damage was almost inevitable. When Iraqi authorities intermingled noncombatants and civilian objects with combatants and military targets, even the reasonable efforts of the Coalition were often inadequate. CENTCOM spokesman Brigadier General Richard Neal described the difficulty of conducting attacks on military infrastructure within the city of Basra:

The military infrastructure is closely interwoven within the city . . . I think our targeteers, and the guys that deliver the ordnance, have taken extraordinary steps to try and limit collateral damage. But I will be quite frank and honest with you, that there is going to be collateral damage because of the proximity of these targets close to, abutting civilian sites.¹⁴⁵

The most tragic collateral damage as a result of commingling of military objects with the civilian population occurred in the attack on the Al-Firdos bunker in Baghdad. The Iraqis constructed this facility in a populated area as an air-raid shelter during the Iran-Iraq war but converted it into a military command and control (C2) bunker. The authorities sealed the entrances to prevent unauthorized access, barbed wired constrained easy entrance and exit, camouflage concealed its location, and armed guards stood watch. Iraqi authorities permitted select civilians—apparently the families of the officers working in the C2 part of the facility—to stay in the former air-raid shelter section of the building above the C2 center. Coalition mission planners were unaware of the presence of these civilians until the media revealed their unfortunate deaths following an F-117 attack.¹⁴⁶

Coalition forces had no obligation under the law of war to refrain from attacking the facility. If they had known of the presence of Iraqi civilians they could have withheld an attack until the civilians had removed themselves. These deaths are regrettable yet inevitable “when a defender fails to honor his own law of war obligations—or callously disregards them, as was the case with Saddam Hussein.”¹⁴⁷ Again, perhaps Saddam intended to leave his citizens at risk to exploit what he perceived as a Coalition weakness—unwillingness to continue a war in which large scale collateral damage was occurring. Following the attack, a review of targeting policies determined them to be proper.¹⁴⁸ However, attacks on Baghdad slowed. In the two weeks prior to the incident, F-117s struck 25 targets in downtown Baghdad. In the subsequent two weeks they hit only five very carefully chosen targets each approved by General Schwarzkopf.¹⁴⁹

The bridges near Baghdad which cross the Euphrates River contained multiple fiber-optic cables providing Saddam Hussein with secure communications to his forces in Kuwait and southern Iraq.¹⁵⁰ This network also included many switching stations (one of which was in the basement of the Al-Rashid Hotel frequented by many journalists) and dozens of relay sites. Striking some of these targets was less than desirable, despite their military significance, because of their locations in populated areas. Successful Coalition attacks on these bridges severed those links and restricted as well the movement of Iraqi military forces, including the deployment of chemical and biological weapons capabilities. The legitimate Coalition attacks on those targets probably injured or killed any civilians crossing those bridges at the time.¹⁵¹ No doubt the loss of these bridges also hampered everyday civilian life. Travel of people, transportation of goods, and normal communications were all likely impeded.

Although civilian areas as such were never targets, Coalition airpower did attack numerous military targets located within civilian populated zones. Despite causing some collateral damage, Coalition attacks on legitimate military targets were consistent with the customary practice of nations as well as the law of war.¹⁵² The assets used demonstrated Coalition efforts to contain the effects of weapons employed. The only manned aircraft to attack central Baghdad was the F-117, which used PGMs every time it attacked. The F-111F did strike some targets on the periphery of Baghdad also using PGMs. Both aircraft types struck only at night when they were less vulnerable. The unmanned, yet extremely precise, Tomahawk Land Attack Missile (TLAM) was also used for both day and night attacks in downtown Baghdad.

Precision munitions were not always precise. During a day light mission, RAF Tornado aircraft attacked a Baghdad river bridge with laser-guided bombs. One weapon, because of defective control fins, veered away from its target and killed an estimated 130 people in a crowded marketplace.¹⁵³ There were additional problems with precise systems. Rick Atkinson describes a typical incident involving the performance of the

F-117. On 30 January 1991, sorties attacking strategic targets reported nine hits and five misses in the first wave. The second wave had sixteen hits and twelve misses while the final wave recorded eleven hits, one miss and two “no-drops” due to poor weather.¹⁵⁴ Coalition planners considered the F-117 their most accurate aircraft system so other systems surely experienced similar problems.

Enemy Exploitation

The Iraqi government used the civilian population and civilian property of both Iraq and Kuwait as shields for military equipment. Ignoring the explicit admonishment of such behavior in international treaties, Iraq placed military assets in urban areas and near objects protected from attack by the law of war. Pronouncements by Coalition leaders that their air forces would not bomb these sites intensified this Iraqi activity. The truth about Iraqi motivations behind this tactic is elusive. Whether the Iraqis were trying to protect assets or to induce collateral damage is unknown. Still, the Iraqis situated military personnel and weapons next to mosques and cultural sites to preclude any Coalition attacks. Similarly, they stored military supplies inside schools, hospitals, and mosques in both Iraq and Kuwait while pilots parked their military helicopters in residential areas. After the war, US troops discovered a cache of Iraqi Silkworm surface-to-surface missiles

inside a Kuwait City school and UN inspectors found production equipment for chemical weapons in a sugar factory inside Iraq.¹⁵⁵

This intentional mingling placed the noncombatants and civilian objects in the vicinity of Iraqi military assets in jeopardy during otherwise legitimate Coalition attacks.¹⁵⁶ For example, Iraqis positioned two fighter aircraft next to the ancient temple of Ur. They obviously were counting on Coalition respect for the protection of cultural property to prevent any attack. This tactic contradicts the law of war, which would allow attacks on the fighters and hold Iraq responsible for any damage to the cultural site. The US commander chose not to attack because the lack of a nearby runway effectively removed the jets from service. This condition limited the value of their destruction when weighed against the risk of damage to the temple and the risk to any attackers.¹⁵⁷

The commander went beyond the requirements of the law of war. Several international treaty provisions, which comprise part of that law, are specific in dealing with the requirement to minimize collateral damage to such sites.¹⁵⁸ However, if an adversary uses these cultural and civilian objects for military purposes, the law does not protect them from direct, intentional attack. During a CENTCOM press briefing, General Neal stated that if Iraq moved military personnel into civilian facilities, “they assume by international law the responsibility of any civilians that are in those type structures. That’s an important point to keep in mind. But our policy remains staying away from civilian structures at this time.”¹⁵⁹ This statement left the door open to attacking those sites later in the war. Had it been absolute, Iraq would have had sanctuaries within their country where we would not attack. It is important not to eliminate military options because that may encourage this type of behavior.

The government of Iraq had reasons to portray the bombing campaign as brutalizing Iraqi civilians. The regime was wont to display every corpse whose death they could attribute to Coalition attack. There were always many journalists present, all eager to photograph such carnage. However, these reporters could not visit sensitive Iraqi military sites where almost all of the damage was taking place. They saw only two significant civilian sites where bombing occurred. The first was an industrial plant, which the Iraqis claimed produced baby formula.¹⁶⁰ The casualties at this factory were negligible. The second was the ill-fated Al-Firdos bunker, which unmistakably produced civilian victims of Coalition bombing. Without minimizing the magnitude of this tragedy, we must understand it in the context that less than 300 people perished in the bunker and the loss of that life was an anomaly of the air campaign.

Iraqi authorities used a deliberate misinformation campaign to convey a highly inaccurate image of indiscriminate Coalition bombing. They attempted to exploit collateral civilian casualties and damage to civilian objects in the hopes of eroding international and US domestic support for the effort to liberate Kuwait. Such misinformation distorted the facts of each incident and did not accurately reflect the tremendous level of caution shown by Coalition bombing attacks. Iraq seized on any instance of collateral damage to create the erroneous impression that the Coalition was targeting civilian areas and objects. These instances even included damage and injury caused by Iraqi surface-to-air missiles and antiaircraft munitions which fell to earth in urban areas. The frequently dense fire the Iraqis expended to try to destroy Coalition aircraft and cruise missiles most likely caused some destruction on the ground. One pilot over Baghdad on the first night of the war reported seeing Iraqi antiaircraft artillery

spraying randomly over the city, even hitting the tops of buildings.¹⁶¹ Malfunctioning fuses or self-destruct features, as well as the impact from spent Iraqi antiaircraft artillery rounds certainly caused damage.

An example of Iraqi misinformation was the 11 February dismantling of a mosque at Al-Basrah. Iraqi authorities tried to feign bomb damage by removing parts of the building following a nearby Coalition attack two weeks prior. US experts noted that the minaret and dome foundation were free from any damage. This was a near-impossibility if air-launched munitions had been responsible for the damage. The nearest bomb crater was well outside the structure.¹⁶²

The government controlling a nation's civilian population has a substantial amount of responsibility for their protection. Historically, as well as from a common sense perspective, this party has the opportunity to minimize risk by separating military objects from the civilian populace, evacuating civilians from the vicinity of immovable objects, and developing air raid procedures. For example, both Allied and Axis powers during World War Two took each of these steps to protect their civilian populations. During Desert Storm, the government of Iraq chose not to exercise routine air-raid precautions. In the month preceding the Coalition air campaign, a civil defense exercise evacuated more than one million civilians from Baghdad. Despite this proven ability, during the bombings, Iraqi authorities did not evacuate a substantial number of civilians from urban areas nor did they attempt to remove any civilians from proximity to legitimate military targets.¹⁶³

Assessment

Chapter Four presented the case that collateral damage is usually not immediately apparent to attackers.¹⁶⁴ This is because the government of the enemy nation usually reports civilian deaths and injuries. The accuracy of the information provided is open to question, especially when that government has a motive to exaggerate the casualties and the damage. Third party officials and media members may bring some objectivity to reports about the amount of damage and injury inflicted or they may just add to the exaggeration. It is possible these people do not have the skills required for an accurate assessment, perhaps they have an agenda to advance, or maybe they are just ignorant or naive. Be that as it may, it is a rare occasion when complete and accurate details are immediately available. A totalitarian regime like Saddam Hussein's normally spews forth wartime rhetoric, which diminishes the credibility of their reports of collateral damage. Prudent skepticism dictates that reports of massive civilian casualties should not escape inquiry. In the case of Desert Storm, there are other avenues which may help determine how many collateral casualties and what degree of collateral damage actually occurred.

Numerous studies following the war estimated the number of casualties attributable to the conflict. Initial reports quoted figures indicating well over 100,000 Iraqi troops died. The US government now believes the correct figure to be below even 10,000.¹⁶⁵ John Heidenrich, in a study conducted two years after the war, concluded that the number of civilian casualties from air attack was also relatively small. At the five week point in the six week airwar, Baghdad radio reported only 1,100 Iraqi civilian deaths.¹⁶⁶ The government of Iraq later revised their official toll dramatically higher, presumably because it was too low to effectively exploit.¹⁶⁷ *The Nation* magazine featured a revealing

article by Erika Munk shortly after the war concluded. In the publication, “not known for its hawkish, pro-Pentagon leanings” Munk reported on her recent trip to Iraq:

Recently I spent four days in Baghdad with a small group of longtime peace activists who’d gone there to document civilian damage caused by US bombing . . . We expected to find enormous unreported destruction . . . Instead, we found a city whose homes and offices were almost entirely intact, where the electricity was coming back on and the water was running.¹⁶⁸

Munk reported that the Iraqis “had no conceivable interest in preventing us from seeing every particle of damage . . . , but I think the reason we didn’t see more destruction was because it wasn’t there.”¹⁶⁹ She compiled her own estimate of the number of civilian deaths in Baghdad by including the highest figures available. Her final total was less than 3,000 and many of these could not be verified.

Heidenrich used circumstantial evidence to establish that the actual figure for Baghdad numbered in the hundreds, not the thousands. To arrive at his estimate, he synthesized the numbers reported by Baghdad Radio, comments from the director of the primary surgical center in Baghdad, and on-the-scene investigations by US anti-war organizations. Considering that one quarter of Iraq’s population lives in Baghdad, and that it was the primary urban area attacked, it should have the highest number of civilian casualties. With the casualties in Baghdad numbering in the hundreds, the other cities in Iraq should have suffered far fewer. He concludes that the likely number of civilian deaths from Coalition air attack, including the Al-Firdos bunker, was probably fewer than 1,000.¹⁷⁰ Military operations in the city of Basra were intense during and after the war, with the Republican Guard suppressing a post-war revolt in the area. So, the information

about the number and causes of casualties there is not as reliable as information about Baghdad.

The Iraqi government collected data on most, if not all, of the instances of collateral damage occurring within Iraq during Desert Storm. These data document over 400 separate instances of collateral damage as the result of air attack. The government released figures which list 8,347 houses destroyed, 5,976 civilians injured, and 2,278 civilians killed. Because most of the ground campaign took place in remote areas, a large percentage of these numbers are likely attributable to air attack.¹⁷¹ These numbers are, of course, open to question. Erika Munk disputes the Iraqi government's claim that 2,500 houses in Baghdad alone were damaged beyond repair. She says that from what she observed, that claim was not credible. She does, however, find the number of civilian deaths reported by the Iraqi government to be essentially correct.¹⁷² Greenpeace International activist William Arkin's study of the Gulf War Airpower Survey shows "a mere 330 weapons (244 laser-guided bombs and 86 Tomahawk cruise missiles) were delivered on Baghdad targets."¹⁷³ If these numbers were accurate, they would tend to corroborate Munk's view.

Arkin traveled to Iraq shortly after the war and believes based on his personal observations and examinations, that Iraqi government figures are accurate "given wartime conditions, inconsistencies in reporting criteria, differing levels of competence in various governorates, and some overstatements by local authorities."¹⁷⁴ If anything, he feels that the national level compilation of data on collateral damage might be on the low side because of poor communications. Ironically, these claims by the government of Iraq are at variance with its wartime propaganda about illegal, spiteful Coalition attacks on

noncombatants. Arkin verifies that while damage incidental to air attacks occurred in several hospitals, schools, and mosques, “the level is so minor as to be practically insignificant.”¹⁷⁵ Presenting inaccurate information about collateral damage poses a dilemma for a government bent on deception. Large numbers are useful as propaganda to accuse the Coalition of conducting a brutal and illegal campaign against noncombatants. Small numbers, on the other hand, could provide credence that the government was effective at protecting its civilians from the enemy. Either way, it is a quandary for that government to solve.

In contrast to the relatively small number of wartime civilian casualties, there were long-term effects from the damage wrought by the bombing campaign. The Coalition destroyed much of Iraq’s infrastructure and, as a result, thousands of Iraqis died after the war ended. Ironically, some observers blame accurate bombing for the civilian deprivations, which led to the post-war deaths. To them, collateral damage did not appear in its previous form as World War Two-type urban annihilation. Rather, because of efficient and precise destruction, it came as post-war deprivation of resources necessary for a modern society to function. This lack of electricity, clean water, and refrigeration for food and medicine caused thousands of deaths. These same observers agree that Coalition planners took great care to minimize the collateral effects of air attack, and that new technologies allowed high standards of accuracy. However, they claim that the planners did not anticipate the impact “that destruction of the civilian life support system would have.”¹⁷⁶

Collateral damage does not always occur immediately. For example, many Coalitions attack and destroyed targets used by both the Iraqi military and civil populace.

The loss of military utility was usually immediate because the asset could no longer be used to oppose an attacking enemy. The impact to the civilian population was slightly delayed. Some time had to pass before food and fuel shortages, untreated water, and lack of electricity compromised people's health. A Greenpeace study alleges that long-term harm befell Iraqi civilians because electricity was unavailable to essential civilian services such as hospitals, sewage treatment, and refrigeration.¹⁷⁷ The Harvard Study Team examining public health in Iraq after the Gulf War reported those Iraqi children had "sharply increased levels of gastroenteritis, cholera, typhoid, and malnutrition due to the delayed effect of the Gulf War."¹⁷⁸ William Arkin estimates an additional 70,000 to 90,000 post-war deaths occurred in the period from April to December 1991. He attributes these to the lack of electricity for water purification and sewage treatment. His final total of deaths due to indirect detrimental health effects of the war was 110,000.¹⁷⁹

These post-war fatalities cannot be attributed only to the results of the infrastructure bombing. Thousands died at the hand of the Republican Guard as they brutally suppressed a post-war uprising against Saddam Hussein's regime. The Guard murdered additional thousands in the months following that revolt. Heidenrich argues that the impact of the Coalition bombing was secondary to this internal conflagration. It is difficult to determine the exact cause of the suffering of the Iraqi people after the war. Granted, Coalition attacks contributed greatly to their post-war problems. Undeniably, civilians underwent hardships because of the infrastructure damage. Some deaths might even be attributable to the UN embargo although it did allow medicine and food into Iraq and there was probably sufficient electricity for hospitals and sewage treatment.¹⁸⁰ Despite the destruction of infrastructure and the embargo, Iraq had the resources to

provide for its people. To many Iraqis, their government was the problem. The Iraqi regime preferred to let average Iraqis suffer rather than allow humanitarian concerns to govern the allocation of electricity and other resources. Attributing the responsibility for Iraq's health problems and increased mortality to the damage inflicted on its infrastructure or the UN embargo ignores the Iraqi government's responsibility for its ruthless disregard of its citizens.¹⁸¹

Conclusion

Conventional bombing of pinpoint targets appeared to be the norm in Desert Storm. Television broadcast vivid images of cruise missiles over Baghdad and precision strikes on urban targets. Theory, practice, and ethics all seemed to gel into a relatively clean and decisive war. From the start, the Coalition's limited war aims and concerns about keeping the Coalition together, influenced the execution of the air campaign. The Coalition exercised extreme restraint about attacking historical sites and residential areas. Taking heed from the experience of Vietnam, US administration officials and military leaders responded quickly to counter any Iraqi claims of indiscriminate bombing. General Schwarzkopf frequently used cockpit video to counter Saddam Hussein's claims of random collateral damage.¹⁸²

Despite all the efforts undertaken by the Coalition to minimize collateral damage, there were instances when it occurred. Civilian or dual-use targets comprised one quarter of the total targets and most of them were in urban settings. A higher risk of collateral damage is likely to occur when a combatant chooses to wage a campaign against targets of this type.¹⁸³ Some weapons missed their targets, defenses shot down cruise missiles

which impacted into residential neighborhoods, and most of the other factors, which cause collateral damage, came into play. These occasions usually degenerated into finger pointing, with the Defense Department accusing the Iraqi government of using its civilians as shields and not carrying out routine air raid precautions. Whether or not Iraq was culpable should not obscure the fact that collateral damage occurred primarily because of Coalition actions.

Coalition efforts were obviously beneficial at reducing collateral damage. The combination of stealth and PGMs required the Coalition to fly fewer sorties and employ fewer munitions in areas populated by civilians. The aircrew of bomb-dropping aircraft had fewer distractions from enemy defenses due to escort fighters and on-going defense suppression activities. Without these capabilities, many attacks would have been impractical because they would have caused too much collateral damage for the limited war aims of the Coalition. Achieving the same effects without these capabilities would require far more aircraft dropping many more weapons. Whether this was practical or not would require an assessment of the advantage gained weighed against the likely increase in collateral damage.

The question lingers about what effect Coalition efforts to minimize collateral damage had on military efficiency. According to General Schwarzkopf, Coalition actions definitely increased the risk to attacking aircrew:

But by requiring that the pilots fly in a certain direction of flight or use a certain type of munition that requires them to go to altitudes that they normally wouldn't be required to go to, those pilots are at much more risk than they would be otherwise. But we have

deliberately decided to do this in order to avoid unnecessary civilian casualties, in order to avoid destroying these religious shrines and that sort of thing.¹⁸⁴

Thus, combat efficiency decreased to the extent that air planners sometimes did not use optimal attack methods. Also, despite the attacks on many Iraqi dual-use facilities, Coalition air forces avoided attacking many others just because they contained a civilian component.¹⁸⁵ The law of war did not preclude such attacks but Coalition concern over collateral damage did. Coalition concerns about minimizing collateral damage forced commanders to make judgments about the benefit of target destruction versus the cost and likelihood of collateral damage. Obviously, perfect judgments and decisions were not possible, so our collateral damage concerns led to less than perfect combat efficiencies. Additionally, smoke and poor weather in the region often prevented the employment of precision weapons and reduced the efficiency of combat operations. Rather than dropping precision weapons during incompatible weather conditions, rules of engagement usually dictated that they be flown back to base because their unguided employment might cause collateral damage.

An adversary unconcerned with collateral damage might be able to perform with greater combat efficiency. However, the Coalition that opposed Iraq in Desert Storm was so rich in the resources needed to conduct a modern war that lowered efficiency would not seriously affect the outcome of the war. The combination of equipment, training, and doctrine the Coalition synergized into a fighting force far exceeded the military capability of Iraq. Coalition forces could project power against whatever facet of Iraq they chose with little to fear except attacks by weapons of mass destruction. Absent these type of attacks, Coalition air forces pummeled Iraq at will. This superiority allowed these air

forces to choose the time and place of their attacks as well as concentrate effort where they desired. Such asymmetry with an enemy makes avoidance of collateral damage easier than if forces were comparable and objectives unlimited.

Thus, it all comes back to context. The Coalition efforts to avoid collateral damage reduced its military efficiency but not to an unacceptable level because of its limited objectives and its great military advantage over Iraq. The few casualties in the Persian Gulf War show that the USAF can wage modern war without excessive brutality, but not all wars are the same. The apparently small amount of collateral damage clearly reflects the success of Coalition efforts and the conditions existing at the time. Has the bar been raised? Should the next air operation expect similarly low levels of collateral damage? The context argument answers “maybe, it depends.” Even so, we should be thankful, and perhaps even proud, that the number of casualties was not as high as it might have been.

¹²⁷. General H. Norman Schwarzkopf, CENTCOM briefing, Riyadh, Saudi Arabia, 27 January 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.

¹²⁸. Rick Atkinson, *Crusade: The Untold Story of the Persian Gulf War* (Boston: Houghton Mifflin Company, 1993), 298.

¹²⁹. Post-war assessments show little or no damage to the buildings near the intended targets. *Conduct of the Persian Gulf War, Final Report to Congress* (Washington DC: United States Department of Defense, April 1992), 131.

¹³⁰. General H. Norman Schwarzkopf, CENTCOM briefing, Riyadh, Saudi Arabia, 30 January 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.

¹³¹. Major General Robert Johnson, CENTCOM briefing , 4 February 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.

¹³². President George Bush, media briefing, 5 February 1991.

¹³³. Atkinson, 225.

¹³⁴. Conduct of the Persian Gulf War, 132-133.

¹³⁵. Ibid., 132-133.

¹³⁶. There are on-going attempts to link the so-called “Gulf War Syndrome” illnesses to some combination of invasive chemical agents. Ibid., 207.

¹³⁷. Thomas W. Lippman, “Iraq May Still Have Nuclear Capability,” *Washington Post*, 22 January 1991, A18.

¹³⁸. Conduct of the Persian Gulf War, 286, 299, 304.

¹³⁹. General Colin Powell, media briefing, 17 January 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.

¹⁴⁰. The Defense Department stated that “From the beginning, Coalition objectives made a clear distinction between the regime and the Iraqi populace . . . the regime and its military capabilities were the target; the Iraqi people were not.” Conduct of the Persian Gulf War, 240.

¹⁴¹. ABC News, “Primetime Live,” 24 January 1991.

¹⁴². These figures are for fixed-wing aircraft only. Attack sorties included interdiction, close air support, and airfield attack (offensive counterair category), Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report* (Washington DC: United States Department of the Air Force, 1993), 200.

¹⁴³. Barton Gellman, “70% of US Bombs Missed Their Targets, Figures Show,” *Kansas City Star*, 16 March 1991.

¹⁴⁴. Department of the Air Force, *White Paper, Air Force Performance in Desert Storm* (Washington DC: April 1991), 1-2.

¹⁴⁵. Brigadier General Richard I. Neal, CENTCOM briefing, 11 February 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1991.

¹⁴⁶. Atkinson, 285-296.

¹⁴⁷. Conduct of the Persian Gulf War, O-15 (Secret). Information extracted is unclassified.

¹⁴⁸. Ibid., 189.

¹⁴⁹. Keaney and Cohen, 219.

¹⁵⁰. Atkinson, 294-296.

¹⁵¹. Conduct of the Persian Gulf War, O-11 (Secret). Information extracted is unclassified.

¹⁵². Ibid., O-12 (Secret). Information extracted is unclassified.

¹⁵³. Atkinson, 288. R. Jeffrey Smith, “Numerous US Bombs Probably Missed Targets,” *Washington Post*, 22 February 1991, A1. “Britain Admits a Bombing Error on Bridge,” *New York Times*, 18 February 1991.

¹⁵⁴. Atkinson, 226-227.

¹⁵⁵. Conduct of the Persian Gulf War, O-11, O-12 (Secret). Information extracted is unclassified.

¹⁵⁶. Ibid., O-11, O-12 (Secret). Information extracted is unclassified.

¹⁵⁷. Ibid., O-14 (Secret). Information extracted is unclassified.

¹⁵⁸. Specifically, Article 23(g) of the Annex to Hague IV prohibits attacks not “imperatively demanded by the necessities of war.” Article 27 provides protection from intentional attack to “buildings dedicated to religion, art, science, or charitable purposes, historic monuments, hospitals, and places where the sick and wounded are collected, provided they are not being used at the time for military purposes.” Article 5 of Hague IX and the 1954 Hague Cultural Property Convention contain similar language.

¹⁵⁹. Brigadier General Richard I. Neal, CENTCOM briefing, 11 February 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.

¹⁶⁰. John G. Heidenrich, “The Gulf War: How Many Iraqis Died?” *Foreign Policy*, Spring 1993, 118.

¹⁶¹. Conduct of the Persian Gulf War, 155.

¹⁶². Ibid., O-12 (Secret). Information extracted is unclassified.

¹⁶³. Ibid., 240, O-14 (Secret). Information extracted is unclassified.

¹⁶⁴. For a discussion on the difficulties of bomb damage assessment during Desert Storm see Keaney and Cohen, 138-143.

¹⁶⁵. John Heidenrich calculates the number of Iraqi military deaths using prisoner interviews, dead Iraqis buried by the Coalition, the small number of wounded Iraqi soldiers captured, wounded-to-killed ratios, and total numbers of Iraqi military personnel. See Heidenrich, 119.

¹⁶⁶. Ibid.

¹⁶⁷. On 6 February 1991, Baghdad Radio reported hundreds of civilian fatalities, including children, after a bombing attack in the southern Iraqi city of Nasiriya. The next day, journalists taken to the location were told that 47 civilians were killed during an attack on a local bridge. Nora Boustany, “Iraq Charges High Civilian Toll in Air Raids,” *Washington Post*, 26 March 1991, A1. For a discussion on how the numbers changed see Clyde R. Mark, “Iraq’s Invasion of Kuwait: A Review of Events,” *CRS Issue Brief 90118*, 22 March 1991, 5.

¹⁶⁸. Erika Munk, “The New Face of Techno-war,” *The Nation*, May 6, 1991, 583.

¹⁶⁹. Ibid.

¹⁷⁰. Heidenrich, 119.

¹⁷¹. William M. Arkin, “*Collateral Damage*” and *Iraqi Civilian Deaths During Operation Desert Storm*, May 1994 (Edition 1), 2.

¹⁷². Munk, 584.

¹⁷³. William M. Arkin, “Dresden, Tokyo, Baghdad? The Urban Sanctuary in Desert Storm,” July 1996, 2. Unpublished manuscript.

¹⁷⁴. Arkin, Collateral Damage, 2.

¹⁷⁵. Ibid.

¹⁷⁶. Ibid.

¹⁷⁷. William M. Arkin, Damian Durrant, and Marianne Cherni, *On Impact: Modern Warfare and the Environment, A Case Study of The Gulf War* (London: Greenpeace, 1991), 147-148.

¹⁷⁸. Harvard Study Team, *Harvard Study Team Report: Public Health in Iraq After the Gulf War*, May 1991, 12-13. Cited in Keaney and Cohen, 75.

¹⁷⁹. Keaney and Cohen, 75.

¹⁸⁰. Heidenrich, 119.

¹⁸¹. Keaney and Cohen, 76.

¹⁸². Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.

¹⁸³. Arkin, Collateral Damage, 3.

¹⁸⁴. General H. Norman Schwarzkopf, CENTCOM briefing, Riyadh, Saudi Arabia, 27 January 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.

¹⁸⁵. Ibid.

Chapter 6

Controlling Collateral Damage

The pilots are operating under a zero tolerance policy for collateral damage. We have the technology to do it, but it can be difficult, particularly at night, in weather, while getting shot at.

—Colonel Charles Wald

Commander, 7490th Wing (P)

Aviano, AB Italy

Air units employed more than 700 precision-guided munitions in Bosnia during Operation Deliberate Force in 1995. Post-conflict assessments reveal that one third of those weapons missed their targets. The causes were an even mix of human error, weather problems, and weapon failures. The amount of collateral damage was nevertheless low because of careful target selection and chosen employment tactics.¹⁸⁶ Obviously, the causes of collateral damage were at work in this campaign, yet little collateral damage occurred. Perhaps, some may wonder, there is a way to control collateral damage.

Military attack has the inherent capability to kill people and destroy things. When employed indiscriminately, it can cause indiscriminate collateral damage. Death and destruction can happen to people and objects in the vicinity of weapon detonations. The

weapons have no regard for whether the people are noncombatants or whether the objects have military value. Alternatively, when employed with specific intent, contemporary air attack can reduce the probability of collateral damage. Careful planning and execution, combined with capable attack systems, can help lessen the occasions of unintended injury and damage. However, despite all attempts to avoid collateral damage, certain causes are difficult to control. This chapter will consider the evidence presented previously and use it to address several considerations about controlling the occurrence of collateral damage.

Dealing with Context

The USAF has arrived at a point where the minimization of collateral damage is required in all of its operations. This is possible in an era where the threat to US national survival posed by a conventionally armed opponent is negligible, and we possess the requisite precision technology. Short of a general war for national survival, striving for this minimization is likely to be a prime consideration in future USAF operations.¹⁸⁷ Operations Desert Storm and Deliberate Force demonstrated that in this context, airpower can come close to conducting a “clean” war. It can destroy the enemy’s ability to fight while inflicting minimal collateral damage. However, these operations were, as are all wars, unique in their own way. The location, leaders, national capabilities, weather, and numerous other factors all came together to form a unique context. These exact scenarios will never occur again. So the ability of airpower to fight a clean war is dependent on the context in which it a nation employs it.

Operation Deliberate Force had an appreciably different context from Desert Storm. The scale and scope of the former were microscopic when compared to the latter.

Deliberate Force occurred in a much smaller geographic area and involved far fewer sorties. In 22 days of operations, aircrews employed weapons on just 12 days. The number of sorties flown in the entire operation equates to a single day's sortie count and a tiny fraction of the weapons released in 43 days of Desert Storm.¹⁸⁸ Deliberate Force intervened in a situation lacking the strong international consensus of Desert Storm. The strategic objective of restoring Kuwait's sovereignty was easy to translate into the military objective of removing Iraqi occupiers from Kuwait. Things were not so clear in Bosnia. Ancient animosities had erupted into violence, which seemed to have no solution save expulsion of entire ethnic groups from the homes where they had lived for decades. All of the ethnic groups involved in the fighting committed atrocities. The international cry for a halt to this carnage eventually led to United Nations and North Atlantic Treaty Organization intervention. Deliberate Force air units conducted aerial attacks against the Bosnian Serb military targets in order to halt their aggression in the region. It was necessary to conduct the operation in a way that would not kill people or destroy property to the extent that world opinion would be so negative as to force a halt to the operation. Deliberate Force was apparently successful in this effort although most of the bombing results remain classified. However, the fact that the Bosnian Serbs did not make any political exploitation of collateral damage is an indication that little occurred.

The military leaders orchestrating Deliberate Force ordered a purposeful effort to avoid harm to enemy civilians.¹⁸⁹ Perhaps there were sufficient reasons to worry about collateral damage in that operation because of its threat to Coalition unity. Yet it is also possible that the USAF is talking itself into a limitation that does not really exist. Dr. Paul Bracken, Professor at Yale University, warns military planners not to “accept

artificial constraints” that come from a perceived domestic sensitivity about enemy civilian casualties.¹⁹⁰

The next attack operation the USAF participates in might produce amounts of collateral damage similar to Desert Storm or Deliberate Force. However, if the context is appreciably different, we might find ourselves disregarding the deaths of enemy civilians. We may return to a scenario similar to World War One or World War Two, during which no nation conducting aerial attack operations overly “concerned itself with the risk of injury to the civilian population of an enemy nation incidental to the conduct of military operations.”¹⁹¹ In such a case, we may consider the national interests we are fighting for to outweigh most consequences of collateral damage. This is not without precedent—American airmen killed hundreds of thousands of civilians during World War Two, albeit not without expressing remorse. Contributing to this carnage was the poor level of bombing system accuracy. During World War Two, imprecise weapon delivery technology made collateral damage almost inevitable, especially during a conflict conducted as a “total war.” Although the USAF periodically renews its faith in strategic bombing, there is no great desire to repeat that World War Two experience. The self-imposed restrictions against such killing seem to have grown in each succeeding war. However, no subsequent war has been a total war. Perhaps advancing technology has improved accuracy to the point that even in a total war collateral damage will be minimal. Still, the context of such a war will be the determining factor.

According to USAF targeting and intelligence manuals, collateral damage is inevitable.¹⁹² This is somewhat misleading, because the likelihood of collateral damage occurring, as well as the number of casualties and the amount of damage, is dependent on

contextual factors. A one-time, well-planned raid using PGMs against easily discernible targets could easily be free of collateral damage. On the other hand, a protracted war, against an enemy fighting in an urban setting, is likely to produce a large amount of collateral damage. Technological advances and careful planning, however, can help control collateral damage. Attempts to improve the USAF's ability to minimize collateral damage must deal with the causes illustrated in Chapter Three. These improvements should focus on alleviating the specific effects discussed in Chapter Four.

Importance of Consequences

During military hostilities, Americans are very sensitive to US casualties.¹⁹³ However, they seem surprisingly insensitive to casualties suffered by foreigners even if they happen to be innocent civilians. There was little sympathy for Japanese civilians killed by aerial bombardment during World War Two. The predominant belief in the US was that the Japanese empire was one large war machine aimed at America. During the war, 10 to 15 percent of Americans polled suggested that extermination was the best alternative for the Japanese people. After the war, 23 percent said the US should have used more atomic bombs on Japan before it could surrender.¹⁹⁴

The Persian Gulf War has differences and similarities with this example. There was very little animosity toward the people of Iraq. Over 60 percent of the American people believed the Iraqis were "innocent of any blame for their leader's policies."¹⁹⁵ However, this did not carry over into an outpouring of sympathy for the limited civilian casualties of air attacks. The extensive media coverage, complete with gruesome photography of victims, had no impact on the American public's lack of sympathy for Iraqi civilian

casualties.¹⁹⁶ Most Americans polled considered the many casualties from the well-publicized attack on the Al-Firdos bunker as victims of an attack on “a legitimate military target,” and “held Saddam Hussein and Iraq responsible.”¹⁹⁷ Likewise, images of the “highway of death” and initial reports that 100,000 Iraqi troops died did not dampen the enthusiastic “victory” celebrations and parades.¹⁹⁸

There are always critics of military actions and Desert Storm is no different. Certain observers disagree with the prevailing view (expressed by international groups like Greenpeace and the International Committee of the Red Cross) that there was surprisingly little collateral damage despite the tons of bombs delivered on urban areas.¹⁹⁹ For example, Japanese journalist Yasuo Kurata claims that the Coalition conducted the air war indiscriminately and the more than 8,000 civilian casualties are testaments to that fact. Invoking images of the bombings of Dresden and Tokyo, he maintains that Americans are insensitive to collateral damage because no one has ever bombed their country.²⁰⁰ This argument overlooks Coalition actions taken expressly to avoid collateral damage. The US did not ignore civilian casualties. Such losses received extensive media coverage and American authorities from the president down took actions to prevent recurrence. Additionally, the experience of being bombed did not stop British or German raids on cities during World War Two nor did it diminish their support for Coalition actions to liberate Kuwait fifty years later.

The idea exists that the American public demands minimal collateral damage from airpower. While the USAF seems to enter operations with this as an assumption, there is little evidence that this is true for more than a small segment of the American population. For instance, public support for the Vietnam War declined as the number of US casualties

increased, not as the number of enemy casualties rose.²⁰¹ In fact, the revelation of the false inflation of enemy “body counts” impinged on domestic support for the war. The enemy losses were only of concern to Americans already opposed to the war. Further, the Al-Firdos incident did not affect American public support for the Gulf War in spite of the great consternation this caused in Washington.²⁰² Additionally, civilian casualties during US military operations in Grenada, Panama, and Somalia generated little attention, while Operation El Dorado Canyon was extremely popular despite the casualties it caused. Finally, Operation Deliberate Force seemed to receive less media coverage in the US than did the evasion of a downed USAF pilot over Bosnia earlier that year. This was despite the shoot-down and capture of two allied aircrew with a full scale air campaign underway.²⁰³

It is difficult to extrapolate the American public’s attitude onto allies and coalition members. These governments must deal with their own domestic political situations. The phenomenon of many governments taking a critical public stand against the United States in order to appease domestic leftist politicians while privately approving of US actions is well-known. However, if these foreigners voice concerns about collateral damage, and their support is vital to an operation, the US should definitely consult with them prior to any attacks. They may be able to successfully handle incidental damage, which occurs quickly and in minimal amounts because those type of incidents can quickly fade with attention focusing elsewhere. However, if collateral damage continues for long periods, it may become increasingly difficult to sustain coalition unity.

Controlling Collateral Damage

Planning

The amount of control achievable depends to an extent on the choices made during the planning process. The military necessity of accomplishing an attack influences the choices available in planning. One sure way to avoid collateral damage inflicted by aerial attack is to avoid flying. Once leaders make the choice to use airpower, the potential for collateral damage automatically rises. As the intensity of the operation increases, an increase in the number of missions becomes militarily necessary which increases the likelihood of collateral damage. Additionally, the more munitions the USAF expends, the greater the probability that the causes of collateral damage will come into play.

Effective planning can reduce the possibility of collateral damage. During planning for Operation Deliberate Force, the desire of the NATO participants to minimize civilian and military casualties dictated both tactics and target selection. Aircraft attacked certain targets at night when the likelihood of anyone being in the area was less than during the day. Bridges originally scheduled for day-time strikes were re-scheduled for attack at night because the operational commander, Lieutenant General Michael Ryan decided that people were more apt to use the bridges during the day.²⁰⁴

General Ryan's tight control of all air operations during Deliberate Force demonstrated another planning method to minimize collateral damage. He maintained a command and control framework, which was, in effect, centralized execution. The general decided not only which targets were struck, but what attack tactics the aircrew used. Such restrictive control is possible in an operation on the scale of Deliberate Force

where it apparently worked well. However, these same procedures, applied in an operation the size of Desert Storm, would quickly reveal their limitations. As any operation grows in size it acquires more targets which must be serviced, more missions which must be planned, and a greater likelihood of more friction entering into the equation. Tight control and centralized execution must eventually give way in order to maintain combat efficiency and effectiveness.

When military necessity dictates that attacks must proceed, a conflict arises between the best way to conduct the attack and concern over the likelihood of collateral damage.²⁰⁵ The best attack method might disregard the factors causing collateral damage. Alternatively, a mission for which the planning focuses heavily on avoiding collateral damage might entail more risk to the attacker and be less likely to succeed in the primary mission. Existing policy and doctrine mitigate the trade-off between military efficiency and concern for collateral damage. Doctrine and policy dictate the factors mission planners and aircrew use when designing and preparing the attack. During the actual conduct of the mission, the fog and friction of war contribute to the conditions that allow the causes of collateral damage to act.

The USAF prescribes certain precautions to take in attack planning. Initially, those planning or deciding to order an air attack must do everything feasible to ensure only military objectives are struck. There are no prohibitions against attacks on military objects, even though such attacks may cause incidental injury or damage to civilians and civilian objects. Air Force Pamphlet 200-18, volume 1, states that despite “precautions, such incidental casualties are inevitable during armed conflict.”²⁰⁶ This incidental damage or injury must not outweigh the expected “direct military advantage.”²⁰⁷

When commanders direct an attack against civilian objects in populated areas, they must carefully weigh the attack's military benefits against the risks to civilians. During Desert Storm, mission planners frequently did this required balancing on a target-by-target basis. They did it not only on a tactical level, but also in overall terms in line with campaign objectives. Military advantage encompasses the full context of a war strategy, not simply the tactical level. In Desert Storm, commanders considered the execution of the Coalition war plan for the liberation of Kuwait when determining lower levels of military advantage. Such precautionary measures gain reinforcement through the application of the traditional military doctrines and principles: economy of force, concentration of effort, target selection for maximization of military advantage, avoidance of excessive collateral damage, accuracy of targeting, and conservation of resources.²⁰⁸ An attack using these doctrines and principles is likely to have the expected military advantage in balance with the probable degree of collateral damage.

The intelligence function augments planning. Inadequate intelligence can lead to instances of collateral damage. Incidents such as the Al-Firdos bunker tragedy demonstrate the results of less-than-perfect information. Any improvements to this challenging and subjective field would provide obvious benefits toward minimizing collateral damage. Not only could attacks avoid known civilian locations, but attacks could employ fewer weapons if the location and function of vital military facilities were available during planning. Of course, perfect intelligence is not attainable. Commanders must act on the information available to them at the time decisions are required. This is another reason why collateral damage is all but unavoidable.

In short, careful planning must consider the effect operations will have on noncombatants and civilian objects. This planning must ensure that the target is a military objective as well as dictate attack procedures to reduce incidental harm. Planners must observe the principle of proportionality and constantly review target lists as circumstances change.

Technology

Improvements in technology can address several of the causes of collateral damage. Advancements in weapon delivery capability reduced one of the major causes—system inadequacies that forced mass attacks on cities to ensure destruction of specific military targets. The advent of precision guided munitions allowed a smaller number of weapons to duplicate what previously took thousands. During Deliberate Force, aircrews employed over 1,000 weapons, 70% of which were PGMs. There were only two confirmed instances of significant collateral damage. Bombs damaged a farmhouse in one incident. In another, an intelligence failure allowed a mistaken attack on a water-treatment plant. The care given to planning during this operation helped avoid collateral damage when precision weapons missed their targets. For example, planners chose the direction from which each aircraft was to release its weapons. Under such conditions, even if the weapon missed its intended target there was minimal chance of it impacting in an inhabited area.²⁰⁹

Stealth technology and defense suppression help create an acceptable level of risk to the attacking aircrew. Additionally, the ability to achieve air superiority also reduces risk to attackers and creates a less hostile environment for them to carry out their tasks. An

attacker relieved of some concerns about enemy defenses might be less prone to make errors and could deal more effectively with conducting his attack. From early in Desert Storm, these factors allowed the Coalition to take military actions, which lowered the risk of harm to noncombatants. Stealth, air superiority, and defense suppression were contributors to this condition. Similarly, in Deliberate Force, air superiority and defense suppression capability allowed attackers to concentrate on accurately delivering their weapons and so lower the likelihood of causing collateral damage.

The munitions being designed for use in the next millennium solve some of the problems that caused collateral damage in Desert Storm. For example, weather and cloud cover adversely affect the delivery accuracy of laser-guided-bombs (LGB). Visible moisture interferes with the laser beam used to designate targets. This causes the LGBs to fall ballistically rather than guide to the laser spot. Instances described earlier in this text showed how this causes collateral damage. The advent of weapons with Global Positioning System and inertial guidance capability negate the requirement for a laser spot. These new weapons are capable of striking targets in any environmental condition. While they do not yet equal the accuracy and penetrating ability of some PGMs, they do make marginal improvements aimed at alleviating two of the causes of collateral damage—adverse environmental conditions and system inadequacies. This ability to attack any set of target location coordinates whenever we want makes the existing shortfalls in intelligence all the more pressing. Our technical capability to strike targets now exceeds our intelligence capability of ascertaining where the important targets are.

One could argue that these same improvements in weapons also eliminate some of the human error, which can lead to collateral damage. Previously the aircrew

accomplished many of the weapon programming and guidance tasks while airborne in a combat environment. The aircrew can now perform these tasks prior to ever getting into the aircraft. This is advantageous because it will relieve them of additional tasks to perform while under stress. However, continuous evaluation must ensure that this new technology does not just change the timing, type, or location of human errors.

Improvements to the launch ranges of weapons can reduce some of the likelihood of collateral damage. Logically, the use of stand-off weapons reduces the number of attacking aircraft that must enter the enemy's zones of air defense. Recall from previous chapters that surface-to-air missiles and antiaircraft artillery can be as dangerous to people on the ground as they are to attacking aircraft. So, one of the outcomes of the increased use of stand-off weapons should be fewer air-defense weapons fired, thus alleviating another cause of collateral damage—enemy defenses.

Acceptance

Controlling collateral damage often equates to just doing the best you can and being prepared to accept any consequences as an example from the Vietnam War illustrates. When selecting targets during the Linebacker I air offensive against North Vietnam, intelligence officers identified the Lang Chi hydroelectric plant. This plant supplied 75 percent of Hanoi's industrial and defense electricity. While it was doubtless a valuable target, it was co-located with a dam, which provided the water source for the plant's water-driven turbines. US analysts estimated that as many as 23,000 civilians might die if an attack on the plant caused collateral damage forcing the dam to give way. This was a clear example of the need to weigh the good (hampering electricity flow to military

forces) against the evil (civilian suffering). The military posed to President Richard Nixon the question of proportionality. Before he would authorize the attack, he required a one-hundred-percent assurance of the destruction of the hydroelectric plant without breach of the dam. The commander of Seventh Air Force, General John W. Vogt, stated he could use laser-guided bombs delivered by F-4 Phantoms. However, due to the friction of war, he could not give complete assurance that the dam would not give way. He replied that he was 90 percent confident of successfully hitting the plant without breaching the dam. With this information, Nixon gave his authorization for the attack. The Phantoms placed twelve 2000-pound laser-guided bombs into the top of the buildings, destroying the electrical generating plant without breaching the dam, which was only 100 feet away.²¹⁰

This demonstrates that despite the ever-possible occurrence of collateral damage, one way to achieve a desired military outcome may be to take steps to avoid collateral damage while being prepared to accept it if it occurs. The USAF has not always approached air attack in this manner. Comments from senior American leaders during Desert Storm pointed out the inevitability of collateral damage while during Deliberate Force, USAF leaders told aircrew that there was zero tolerance for collateral damage.²¹¹ As always, the context of the operation dictates the steps one takes.

Dealing with Enemy Exploitation

Examination of Operation Desert Storm reveals a vulnerability discovered in previous wars—US concern about collateral damage. This concern can prove advantageous to adversaries willing to exploit our humanitarian concerns. They can try to

ensure that collateral damage is inevitable and so deter attacks on legitimate military targets. For example, rather than merely storing military equipment in residential areas, an enemy could structurally combine facilities so that civilian schools are part of military nuclear weapons laboratories. An enemy might trick the USAF into bombing civilian buildings, which mimic the electronic emanations of a military command facility. That same enemy could fake destruction of civilian installations or just make it hard for attackers to determine who is friendly and who is not.²¹²

The law of war admonishes this “induced” collateral damage. It states that in the effort to minimize civilian casualties, a substantial responsibility rests with the party controlling the civilian population. The reason for this is simple; in most situations, the attacker is unaware of the location of civilians and has no way of controlling their movements. Nevertheless, an attacker cannot always depend on a defender to take reasonable precautions to protect his own noncombatants. When a defender has failed to separate the civilian population from military objectives, he has made a conscious decision to leave them at risk.²¹³ Even though the law of war is on our side, any collateral damage in the era of CNN can be politically irksome. The methods for controlling collateral damage described previously are only minimally effective when dealing with enemy attempts to induce collateral damage. For example, precision weapons cannot destroy only the one room in a schoolhouse that the military uses. Similarly, the best attack planning in the world will not eliminate collateral damage from occurring to an enemy who tries making it happen. Acceptance of the inevitability of collateral damage within the proportionality principle may be all an attacker can do of course, the context of

any given situation will determine what a nation can and will do to counter an adversary who attempts to induce collateral damage.

Enemy misinformation about collateral damage is easier to counter. Presentation of evidence and allowing media and third party access for verification can diminish the effect of enemy rhetoric and propaganda. The video recorders on most attack aircraft depict the impacts of the released weapons and so are useful in showing generalities about the likelihood of collateral damage.²¹⁴ Reconnaissance and surveillance assets can also provide evidence. Truthful revelations about known collateral damage can also debunk concocted enemy claims.

Conclusion

The USAF is in the era of the precision weapon. Airpower now has the ability to accurately attack targets and cause minimal collateral damage. However, the demonstration of accuracy achieved in Desert Storm and Deliberate Force might have conveyed the fantasy that collateral damage is a problem of the past. Unfortunately, military leaders sometimes propagate that delusion when they overstate a case to explain an operation's effectiveness. For example, Secretary of Defense William Perry speaking about Deliberate Force said:

Every target that had been designated was destroyed and there was zero collateral damage. This was a rare instance where by combination of exclusive use of precision guided ammunitions and very strict rules of engagement we conducted this massive campaign with no damage, no damage to civilians, no damage of any kind.²¹⁵

While Deliberate Force was very successful, collateral damage did occur. Statements, which obfuscate that reality, may create unrealistic expectations among the American public. The USAF is not free of blame in this regard. Cockpit videotapes shown to the media by USAF officers usually only show successful attacks. Precision weapons, which missed their targets for whatever reason, are rarely presented for public scrutiny. Thus, we are also guilty of building false expectations. These expectations may be potentially dangerous for future air operations. American leaders, both military and civilian, must understand that airpower can minimize collateral damage but airpower can rarely eliminate collateral damage. Political pressure to minimize collateral damage should not constrain operations by dictating a requirement of zero collateral damage.

Careful planning and improved technology can help control collateral damage. However, American leaders must accept that collateral damage will not disappear any time soon. The USAF can currently only improve at the margins when it attempts to minimize collateral damage. The context of an operation will determine the emphasis leaders place on minimizing collateral damage. This emphasis will determine the degree of occurrence.

186. *Deliberate Force: A Case Study in Effective Air Campaigning*, Second Draft of the Air University Balkans Air Campaign Study, School of Advanced Airpower Study, United States Air Force, Maxwell Air Force Base, AL, Chapter 11, 46. Used with permission. Information extracted is unclassified.

187. Karl W. Eikenberry, “Take No Casualties,” *Parameters*, Summer 1996, 109-118.

188. Balkans Air Campaign Study, Summary 25-26. Information extracted is unclassified.

189. Balkans Air Campaign Study, Chapter 11, 40. Information extracted is unclassified.

190. Dr. Paul Bracken, Professor of Political Science, address to the Air Force Association/HQ USAF/XO conference on “Airpower and the Revolution in Military Affairs,” Crystal City Marriott Hotel, Crystal City, Virginia, 17 January 1995.

191. Hays W. Parks, “Air War and the Law of War,” *Air Force Law Review* (1990), 153.

192. Air Force Pamphlet 200-18, vol. I, *Target Intelligence Handbook; Unclassified Targeting Principles*, states “In spite of precautions, such incidental casualties are inevitable during armed conflict.” Air Force Pamphlet (AFP) 200-18, vol. I, *Target Intelligence Handbook; Unclassified Targeting Principles*,

1 October 1990, 97. Additionally, Air Force Pamphlet 200-17, *An Introduction to Air Force Targeting*, provides a definition of collateral damage by stating it is unavoidable during combat: “In spite of precautions, . . . incidental [civilian] casualties and damage are inevitable during armed conflict.” Air Force Pamphlet (AFP) 200-17, *An Introduction to Air Force Targeting*, 11 October 1978, 8-2.

193. The degree of tolerance for casualties is a function of the perceived stakes involved. Eric V. Larson, *Casualties and Consensus; The Historical Role of Casualties in Domestic Support for US Military Operations*, RAND, 1996, xvi, xvii.

194. John Mueller, “Fifteen Propositions About American Foreign Policy and Public Opinion in an Era Free of Compelling Threats,” unpublished manuscript prepared for presentation at the National Convention of the International Studies Association, San Diego, California, April 16-20, 1996, University of Rochester, NY, 31 March 1996, 8.

195. Interestingly, this lack of animosity seems to have been reciprocated by the Iraqi people toward Americans. Milton Viorst, “Report From Baghdad,” *New Yorker*, 24 June 1991, 60. Also see Mueller, “Fifteen Propositions,” 8.

196. John Mueller, *Policy and Opinion in the Gulf War* (Chicago, University of Chicago Press, 1994), 79.

197. *Ibid.*

198. Mueller, “Fifteen Propositions,” 8.

199. William M. Arkin, et al, *On Impact , Modern Warfare and the Environment: A Case Study of the Gulf War*, A Greenpeace Study 1991, 46-48.

200. Yasuo Kurata, “Americans are Insensitive to Casualties Because Their Country Hasn’t Been Bombed,” *Kansas City Star*, 5 May 1991, K2, as cited in Crane, Conrad C., *Bombs, Cities, and Civilians: American Airpower Strategy in World War Two* (Lawrence, Kansas: University Press of Kansas, 1993), 158.

201. Larson, 27-29.

202. Mueller, Policy and Opinion in the Gulf War, 79.

203. Several of the ideas in this section came from Karl Mueller, Professor at the USAF School of Advanced Airpower Studies, Maxwell AFB, AL.

204. Balkans Air Campaign Study, Chapter 11, 40. Information extracted is unclassified.

205. Military advantage is not restricted to tactical gains, but is linked to the full context of a war strategy. In Desert Storm the execution of the Coalition war plan for liberation of Kuwait was considered when determining lower levels of military advantage.

206. AFP 200-18, vol. I, 97.

207. Ibid.

208. Ibid.

209. Ninety-eight percent of USAF munitions were PGMs. Balkans Air Campaign Study, Chapter 11, 36, 45. Information extracted is unclassified.

210. Hays W. Parks, "Air War and the Law of War," *Air Force Law Review* (1990), 169.

211. Colonel Charles Wald, commander of the 31st Fighter Wing and the 7490th Provisional Wing at Aviano Air Base, Italy, said the pilots are operating under a zero tolerance policy for collateral damage. See Captain Lindsey Borg, "Collateral Damage Edict Challenges Pilots," *Air Force News Service*, 2 December 1995.

212. Patrick J. Garrity, "Implications of the Persian Gulf War for Regional Powers," *The Washington Quarterly*, Summer 1993, 165.

213. Parks, 29.

214. Videotape imagery countered enemy misinformation in the 1980s when a single videotape showed F-111 precision bombing of military targets in Libya, crushing Libyan leader Moammar Gadhafi's assertion that US aircraft targeted innocent civilians. AFM 3-M, *Aerospace Functional Doctrine Combat Camera*, draft, 14 April 1992, 10.

215. William J. Perry, Secretary of Defense, DoD News Briefing, Speech to the Adjutants General Association of the United States, 7 February 1996. Cited in Balkans Air Campaign Study, Chapter 11. Used with permission. Information extracted is unclassified.

BIBLIOGRAPHY

- ABC News, "Primetime Live," 24 January 1991.
- AFM 1-1 Volume 1, *Basic Aerospace Doctrine of the United States Air Force*, March 1992.
- AFM 3-M, *Aerospace Functional Doctrine Combat Camera*, draft, 14 April 1992.
- AFM 11-1, *Air Force Glossary of Standardized Terms*, 29 September 1989.
- AFP 110-31, *International Law-The Conduct of Armed Conflict and Air Operations*, 19 November 1996.
- AFP 110-34, *Commander's Handbook on the Law of Armed Conflict*, 25 July 1980.
- AFP 200-17, *An Introduction to Air Force Targeting*, 11 October 1978.
- AFP 200-18 vol. I, *Targeting Intelligence Handbook, Unclassified Targeting Principles*, 1 October 1990.
- Ali, A. Yusuf. *The Holy Qur'an, Text, Translation, and Commentary*. Brentwood, MD: Amana Corporation, 1983.
- Appel, Bernard. "Bombing Accuracy in a Combat Environment," *Air University Review*, July-August 1975.
- Arkin, William M. *Collateral Damage and Iraqi Civilian Deaths During Operation Desert Storm*, May 1994 (Edition 1).
- _____. "Dresden, Tokyo, Baghdad? The Urban Sanctuary in Desert Storm," July 1996. Unpublished manuscript.
- Arkin, William M. et al, *On Impact, Modern Warfare and the Environment, A Case Study of The Gulf War*. London, Greenpeace, 1991.
- Atkinson, Rick. *Crusade: The Untold Story of the Persian Gulf War*. Boston, Houghton Mifflin Company, 1993.
- Bainton, Roland. *Christian Attitudes Toward War and Peace*. New York: Abingdon, 1960.
- Borg, Captain Lindsey. "Collateral Damage Edict Challenges Pilots," *Air Force News Service*, 2 December 1995.
- Boustany, Nora. "Iraq Charges High Civilian Toll in Air Raids," *Washington Post*, 26 March 1991.
- Bracken, Dr. Paul. Address to the Air Force Association/HQ USAF/XO conference on "Airpower and the Revolution in Military Affairs," Crystal City Marriott Hotel, Crystal City, Virginia, 17 January 1995.
- "Britain Admits a Bombing Error on Bridge," *New York Times*, 18 February 1991.
- Bush, President George. Media briefing, 5 February 1991.
- The Challenge of Peace: God's Promise and Our Response*. Washington, DC: United States Catholic Conference, 1983.

- Clodfelter, Mark. *The Limits of Airpower, The American Bombing of North Vietnam*. New York: The Free Press, 1989.
- Conduct of the Persian Gulf War, (Unclassified) Final Report to Congress, Appendix O* (Secret) April 1992.
- Corum, James S. "The Luftwaffe and the Coalition Air War in Spain, 1936-1939," Frank Cass Journals, London.
- Coverdale, John. *Italian Intervention in the Spanish Civil War*. Princeton, NJ: Princeton University Press, 1975.
- Crane, Conrad C. *Bombs, Cities, and Civilians: American Airpower Strategy in World War II*. Lawrence, Kansas: University Press of Kansas, 1993.
- Craven, Wesley Frank and James Lea Cates, eds. *The Army Air Forces in World War II*. Chicago: University of Chicago Press, 1948-1953.
- Deliberate Force: A Case Study in Effective Air Campaigning, Second Draft of the Air University Balkans Air Campaign Study*, School of Advanced Airpower Study, United States Air Force, Maxwell Air Force Base, AL. Used with permission. Information extracted is unclassified.
- Eikenberry, Karl W. "Take No Casualties," *Parameters*, Summer 1996.
- Fogleman, General Ronald R. "The Core Competencies of the Air Force," *Air Force Magazine*, January 1997.
- Fuller, J.F.C. *The Conduct of War, 1789-1861*. New Brunswick, NJ: Rutgers University Press, 1961.
- Futrell, Robert F. *The United States Air Force in Korea, 1950-1953*. Washington DC: Office of Air Force History, 1983.
- Garrity, Patrick J. "Implications of the Persian Gulf War for Regional Powers," *The Washington Quarterly*, Summer 1993, 165.
- Gellman, Barton "70% of US Bombs Missed Their Targets, Figures Show," *Kansas City Star*, 16 March 1991.
- Harvard Study Team Report: Public Health in Iraq After the Gulf War*, Harvard Study Team, May 1991.
- Hearings before the Preparedness Investigating Subcommittee of the Committee on Armed Services, Air War Against North Vietnam, 90th Congress, 1st Session, USGPO, Washington, 1967.
- Heidenrich, John G. "The Gulf War: How Many Iraqis Died?" *Foreign Policy*, Spring 1993.
- Hosmer, Stephen T. *Constraints on US Military Strategies in Past Third World Conflicts*. RAND, July 1984.
- "The Invasion of Panama: How Many Innocent Bystanders Perished?" *Report of the Investigations Subcommittee of the Committee on Armed Services House of Representatives*, 7 July 1992.
- "Iraq Declares Cease-Fire After More Attacks by US, Allies," and "US Missile Attack Targets Iraqi Intelligence Agency; Baghdad Raid Retaliates for Bush Death Plot," *Facts on File Yearbook*, 1993.
- Johnson, Lyndon B. *The Vantage Point*. New York: Holt, Rinehart and Winston, 1971.

- Johnson, Major General Robert. CENTCOM briefing , 4 February 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.
- Keaney, Thomas A. and Eliot A. Cohen. *Gulf War Air Power Survey Summary Report*. Washington DC: United States Department of the Air Force, 1993.
- Kennedy, Robert F. *Thirteen Days: A Memoir of the Cuban Missile Crisis*. New York: W.W. Norton and Company Inc. 1971.
- Kurata, Yasuo. "Americans are Insensitive to Casualties Because Their Country Hasn't Been Bombed." *Kansas City Star*, 5 May 1991.
- Kuter, Stanley I. ed. *Encyclopedia of the Vietnam War*. New York: Charles Scribner's Sons, 1996
- Larson, Eric V. *Casualties and Consensus; The Historical Role of Casualties in Domestic Support for US Military Operations*. RAND, 1996.
- Leroy, Howard S. "Limitations of Air Warfare." *Air Law Review*, 12-1, Jan. 1941.
- Lewy, Guenter. *America in Vietnam*. New York: Oxford University Press, 1981.
- Lippman, Thomas W. "Iraq May Still Have Nuclear Capability." *Washington Post*, 22 January 1991.
- Luttwak, Edward N. "Toward Post-Heroic Warfare." *Foreign Affairs*, vol. 74, no. 3, May-June 95.
- Mark, Clyde R. "Iraq's Invasion of Kuwait: A Review of Events." *CRS Issue Brief 90118*, 22 March 1991.
- McFarland, Stephan L. *America's Pursuit of Precision Bombing, 1910-1945*. Washington and London: Smithsonian Institution Press, 1995.
- Meilinger, Phillip S. "Winged Defense: Airwar, The Law, and Morality." *Armed Forces and Society*, Fall 1993, vol. 20, number 1.
- Miller, Richard I. ed. *The Law of War*. Lexington, MA: DC Heath and Company, 1975.
- Momyer, William C. *Air Power in Three Wars*. Department of the Air Force, Air University, Maxwell Air Force Base, Alabama, 1978.
- Mueller, John. "Fifteen Propositions About American Foreign Policy and Public Opinion in an Era Free of Compelling Threats." University of Rochester, NY, March 1996.
- _____. *Policy and Opinion in the Gulf War*. Chicago, University of Chicago Press, 1994.
- Munk, Erika. "The New Face of Techno-war," *The Nation*, May 6, 1991.
- Neal, Brigadier General Richard I. CENTCOM briefing, 11 February 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.
- Needless Deaths in the Gulf War: Civilian Casualties During the Air Campaign and Violations of the Laws of War*. Human Rights Watch. 1991.
- Nixon, Richard M. *The Memoirs of Richard Nixon*. New York: Grosset and Dunlap, 1978.
- Parks, Hays W. "Air War and the Law of War," *Air Force Law Review*, 1990.
- _____. "Rolling Thunder and the Law of War," *Air University Review*, Vol. 33, No. 2, Jan-Feb 1982.
- The Pentagon Papers*, Senator Gravel Edition, Vol. 4. Boston: Beacon Press, undated.

- Perry, Secretary of Defense William J. DoD News Briefing, Speech to the Adjutants General Association of the United States, 7 February 1996.
- Powell, General Colin. Media briefing, 17 January 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.
- Russell, Frederick H. *The Just War in the Middle Ages*. Cambridge University Press, 1975.
- Schaffer, Ronald. "American Military Ethics in World War II: The Bombing of German Civilians," *Journal of American History*. September 1980.
- _____. *Wings of Judgment: American Bombing in World War II*. New York, Oxford, 1985.
- Schlight, John. *The War in South Vietnam: The Years of the Offensive, 1965-1968*. Washington DC: Office of Air Force History, 1988.
- Schwarzkopf, General H. Norman. CENTCOM briefing, Riyadh, Saudi Arabia, 27, 30 January 1991, Office of the Assistant Secretary of Defense for Public Affairs Operation Desert Storm press transcripts, 17 January through 15 March 1981.
- Sharp, Ulysses S. Grant. *Strategy for Defeat: Vietnam in Retrospect*. San Rafael, CA: Presidio Press, 1978.
- Smith, R. Jeffrey. "Numerous US Bombs Probably Missed Targets," *Washington Post*, 22 February 1991
- Sorensen, Theodore C. *Kennedy*. New York: Harper and Row, 1965.
- Spiro, Melford. *Buddhism and Society*. New York: Harper and Row, 1970.
- "Tears, Blood, and Cries: Human Rights in Afghanistan Since the Invasion, 1979-1984." *A Helsinki Watch Report*, December 1984.
- Tooke, Joan D. *The Just War in Aquinas and Grotius*. London: Society for Promoting Christian Knowledge, 1965.
- Tilford, Earl H. Jr., *Setup: What the Air Force Did in Vietnam and Why*. Air University Press, 1991.
- "US Aircraft, UN Forces Attack Somali Warlord: Pakistani Troops Fire on Protesters," *Facts on File Yearbook, 1993*.
- US Army Forces Somalia, 10th Mountain Division After Action Report, undated.
- Venkus, Robert E. *Raid on Qaddafi: The Untold Story of History's Longest Fighter Mission by the Man Who Directed It*. New York: St. Martins Press, 1992.
- Viorst, Milton. "Report From Baghdad," *New Yorker*, 24 June 1991.
- Vogt, John W. Commander in Chief, Pacific Air Forces, in a speech to the Honolulu Rotary Club, 4 December 1973, Air Force Historical Research Agency, K168.06-234, Dobin # 0571583.
- Webster, C. and N. Frankland. *The Strategic Air Offensive Against Germany 1939-1945*. London: 1961.
- Weinberger, Casper W. *Fighting for Peace*. New York: Warner Books, 1990.
- Westmoreland, William C. *A Soldier Reports*. Garden City, New York: Doubleday and Company, Inc., 1976.
- White Paper, Air Force Performance in Desert Storm*. Washington DC: Department of the Air Force, April 1991.

Wright, Quincy. *A Study of War*, 2nd. ed. Chicago and London: University of Chicago Press, 1965.

Ziegler, Gary S. "Weather Problems Affecting Use of Precision Guided Munitions." 32, *Naval War College Review*, May-June 1979.